July 9, 1945

TECHNOLOGY D

# STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

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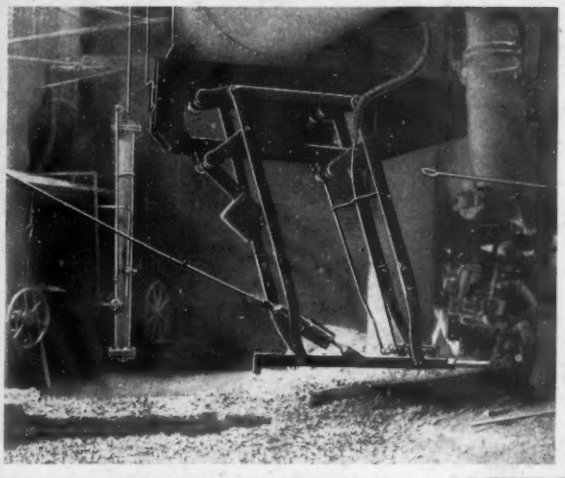
JUL 9 1945
DETROIT

Bailey

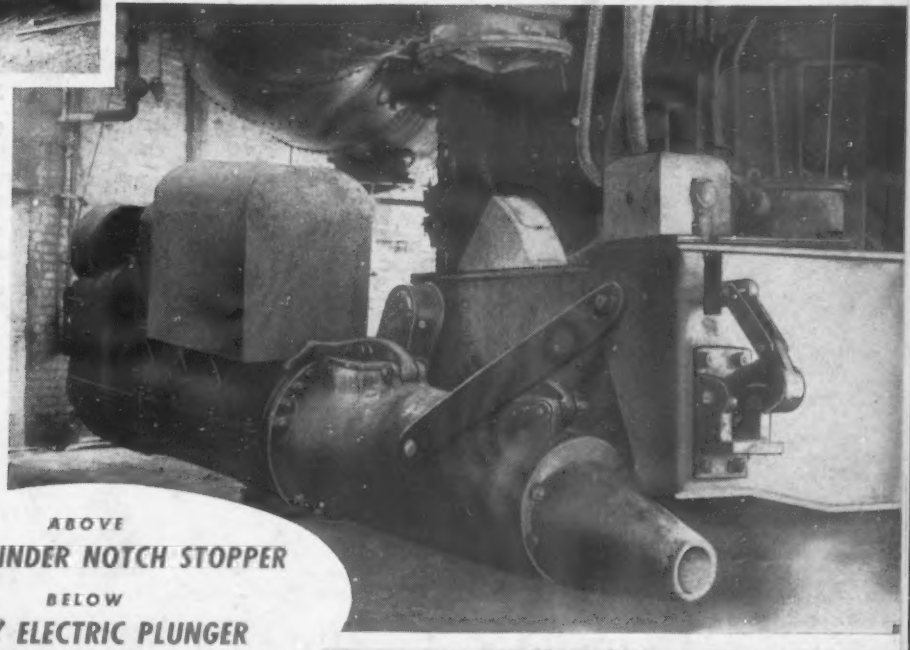
Designers and Builders of

★ LABOR SAVING
★ COST REDUCING
★ PRODUCTION INCREASING

Equipment FOR BLAST FURNACES



Two Bailey-proved allies of iron production . . . both are examples of mathematical perfection . . . both do their jobs year after year without maintenance!



ABOVE
BAILEY CINDER NOTCH STOPPER
BELOW
BAILEY ELECTRIC PLUNGER CLAY GUN

Ruggedly Constructed for Severe Service!

WILLIAM M. BAILEY COMPANY Engineers PITTSBURGH, PA

# EC&M Control has Outstanding Advantages for DIESEL-ELECTRIC Cranes

Portal Crane by Washington Iron Works, Seattle, Wash. equipped with EC&M Control and Type WB Brakes.

Washington Iron Works takes advantage of the inherent safety and quick response in operation of series-wound brakes and the simplicity and better characteristics of series motors for the hoists of their Portal Cranes.

The EC&M Wright Dynamic Lowering Circuit Controller prevents heavy peak loads on the Diesel-Generator, because—

**1** *All* line current passes through the brake coil on the first point lowering to insure quick brake release with minimum power.

**2** TIME-CURRENT Relays retard the rate of acceleration of heavy loads in hoisting, yet allow faster operation with light loads.

Specify EC&M Control for your cranes to get these exclusive advantages.

**THE ELECTRIC CONTROLLER AND MANUFACTURING CO.**

2698 EAST 79TH STREET CLEVELAND 4, OHIO

Operator's Cab (Seat Removed) shows efficient arrangement of Master Switches and Clutch Pilot-levers.

Hoist unit—Magnetic Control Panels and Type H Alloy Grid Resistors (overhead).

TECHNOLOGY DEPT:

# What's the JOB

## For Steel Structures Call on Bethlehem

Eleven strategically-located fabricating works make up the core of Bethlehem's Fabricated Steel Construction organization, whose capacity is nearly a million tons of steelwork a year. This organization is equipped to fabricate and erect steel structures in great variety and volume.

Take a quick swing around the works. No matter what kind of fabrication job, there's at least one Bethlehem shop to do it —and in most cases several.

Heavy bridge-work and buildings? Pottstown, Rankin and Steelton, Pa., Works, and Chicago Works, can handle the heaviest—and general-purpose structures as well.

Steel plate construction? Large-diameter pipe? Leetsdale, Pa., No. 1 shop fabricates tanks, barges, pipe, heavy weldments, special and complicated jobs in great variety, using much special equipment.

Beam-and-column work? Beam bridges? Bethlehem Works specializes in these.

All-around fabrication? Alameda, Calif., does it, plus some heavy work. Los Angeles handles such jobs as gas storage tanks and shipbuilding subassemblies. Buffalo and Leetsdale No. 2 shops can fabricate anything except plate work and extra-heavy members. South San Francisco fabricates transmission towers and similar galvanized structures.

Add to these eleven fabricating works Bethlehem's staff of skilled engineers and designers, as well as personnel in five erection districts, and you have a team which is geared to build efficiently and build fast.

**FABRICATED STEEL CONSTRUCTION**

BETHLEHEM STEEL ★

# MORE JOBS

## THAN YOU CAN THINK OF

It is a long list of jobs that a Cincinnati Press Brake will do . . . forming, progressive forming, corrugating, notching, punching, and others. The majority of jobbing work can be handled with simple dies. The "goose-neck" die illustrated is a relatively simple die for making channels and other special shapes which cannot be made with a straight male die. Special dies further increase the wide utility of Cincinnati Press Brakes.

Write for Catalog B-2 or consult our Engineering Department on your special problem.

## THE CINCINNATI SHAPER CO.

CINCINNATI OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

# *Lift* YOUR LOADS
# *Lower* YOUR COSTS

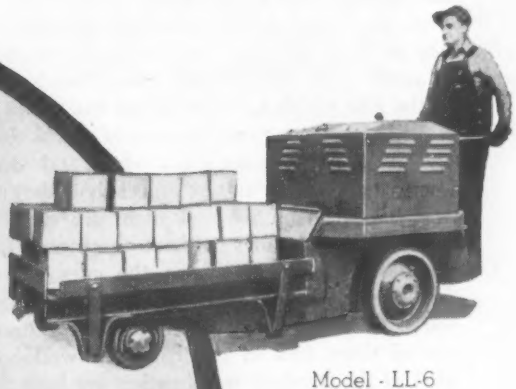
Put an EASTON Tier-Lift truck on the job. Watch it give your materials a lift—watch your handling costs go down.

Powered by storage battery or gas-electric Ready Power in capacities up to 10,000 pounds. EASTON trucks are easy to operate, economical to maintain—they stay on the job.

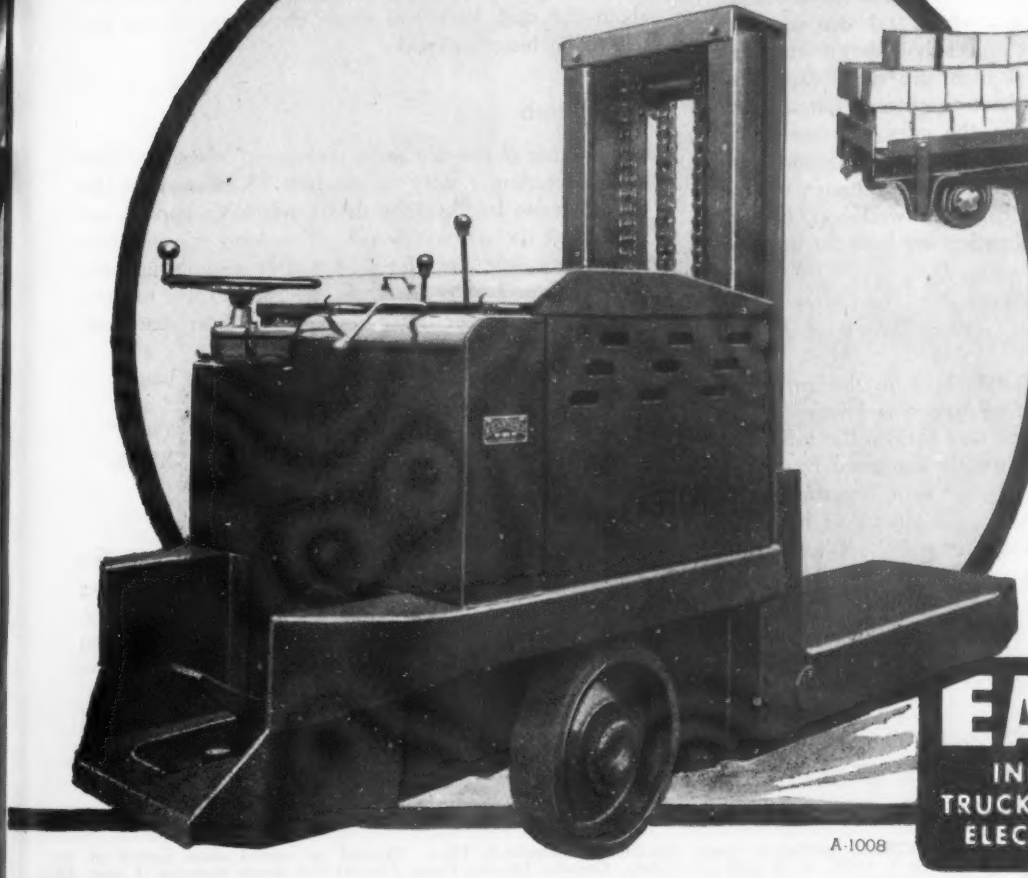
EASTON builds the original Tier-Lift electric truck. Backed by 30 years of experience the Tier-Lift, Low-Lift—also Platform and special types—solve unusual jobs.

Write Engineering Counsel, Easton Car and Construction Company, Easton, Pennsylvania.

Model - TLC-6



Model - LL-6



Model - TLC-6

A-1008

**EASTON**
INDUSTRIAL CARS
TRUCK BODIES · TRAILERS
ELECTRIC LIFT TRUCKS

# BEHIND THE SCENES

## What Next?

■ One of the more interesting strikes we've heard about lately concerns a steel company in New York. It seems there was a hypersensitive individual (there's one in every plant) who would yell and burst forth with a considerable string of loud and forceful invective, which is a polite way of saying that he cussed a blue streak, whenever one of his fellow workers would sneak up behind him and make with a loud whistle. This was just good harmless fun, until the plant started to employ women. After a couple of these outbursts, one of the women workers complained about this guy's language, and it finally became an issue. She was a union member in good standing, and she demanded the union do something about it. So they asked the guy to cut the cussing, and when he didn't seem to subside, they demanded the company fire him. Company said no, and came the strike. At last reports, the case was headed for a WLB hearing, which should be interesting.

## New Device

■ The other day we ran into a new invention which has been assisting the war effort no end, and it's one of those simple things nobody ever thought of before. This device is so vital that its maker has had top priorities, his men have been deferred, and it's all because workers, especially girls, get tired of sitting at a workbench and have to stand up for relaxation every once in a while. When they stand up, of course, they lose production until they sit down and start back to work. So this thoughtful outfit built and patented a workbench with a crank on the side which raises or lowers the top of the bench. When the gal gets tired, she merely cranks the bench up and works standing up for a while, and vice versa, or something. Gals like it, too, especially if they're on piecework rates, which most of them are these days. Increases their earnings without increasing fatigue, and everybody's happy, including the guys who are selling the benches as fast as they can make them! Great postwar outlook, too. In fact, we'd like very much to have one of those jobs in our basement workshop, because most of the standard workbenches are built for less than our 6-foot frame.

## Style Book

■ Well, we have a new style book in this printshop. That's really a major accomplishment, and we're breathing easier, too, because since way back in the early days of this column we've been greatly hampered by our inability to commit to memory the many vagaries of the style book. The greybeards on the ninth floor have long looked askance at our misappropriate applications of verbs and question marks and the small degree of awe with which we regarded the admonitions of the book. At last we can write with impunity such things as °F instead of degrees Fahr., and we don't have to write out Forty-second street, but we can say 42nd St. We really ought to figure out how much time, ink and paper has been wasted in the past 20 years following that 1924 model, but probably the only thing we can do graciously is to murmur a few prayers of thanks and keep right on making our usual errors of grammar, syntax and punctuation.

## Export Trade Starting

■ The San Francisco conference is officially over, and there's bound to be a lot of talk in Congress and elsewhere about American participation in world affairs, etc., etc., but it seems to us that the matter has already passed out of the hands of the politicians. At least from where we sit, it looks like American industry has decided not to wait for the hot air and red tape, but has already started to build a lot of export business. The editorial department reports a lot of releases coming in these days announcing appointments of new sales managers for South America, France, the Middle East and elsewhere. One release the other day not only announced the name of the firm's Paris sales manager, but also announced bookings of several millions of dollars worth of nice shiny French orders. As yet we haven't heard of any German offices being reopened, but our government is paving the way by establishing fact-finding offices which will help straighten out the tangled lines of Nazi domination in American-owned industry in the late, unlamented Reich.

## DDT

■ The mosquito season being what it is this year, with an excess of rain in the spring, we've been able to get some advance protection by wangling a few grams of DDT from a chemist of our acquaintance who is experimenting with the stuff. Later on this year we shall be most pleased to let you know if all the tales they tell about the stuff have had much circulation among the Lake Erie insect hoi-polloi.

## Bug Bomb

■ Speaking of the demise of uncultured insects, we just finished reading a story in our June 25 issue about the Westinghouse bug bomb, a device which we hope to see a lot of in the postwar world. The Army specifications are really a little fancy for us, but after reading the story on how these bombs are made, we fully expect to have one attached to our beach umbrella no later than next summer.

"A well-filled bug bomb, underneath the bough
A loaf of bread, a jug a wine and thou,
There'll be no sand-flies make me holler, "OW!"
—O. K. the XXXXXIVth

## Grounds for Murder

■ We've always been a sucker for Col. Stoopnagle's definitions and apparently the editor of the Armstrong Machine Works magazine was bitten by the same bug. In his last issue he says, "A tomahawk is what, if you go to sleep suddenly and wake up without hair, there is an Indian with."

And a joke like that is what, if there weren't capital punishment in Ohio, we'd probably be murdered over.

SHRDLU

Vol. 117, No. 2, July 9, 1945, issue of STEEL, published every Monday at Celveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 65

# SAVE UP TO 60%

# *By Making*

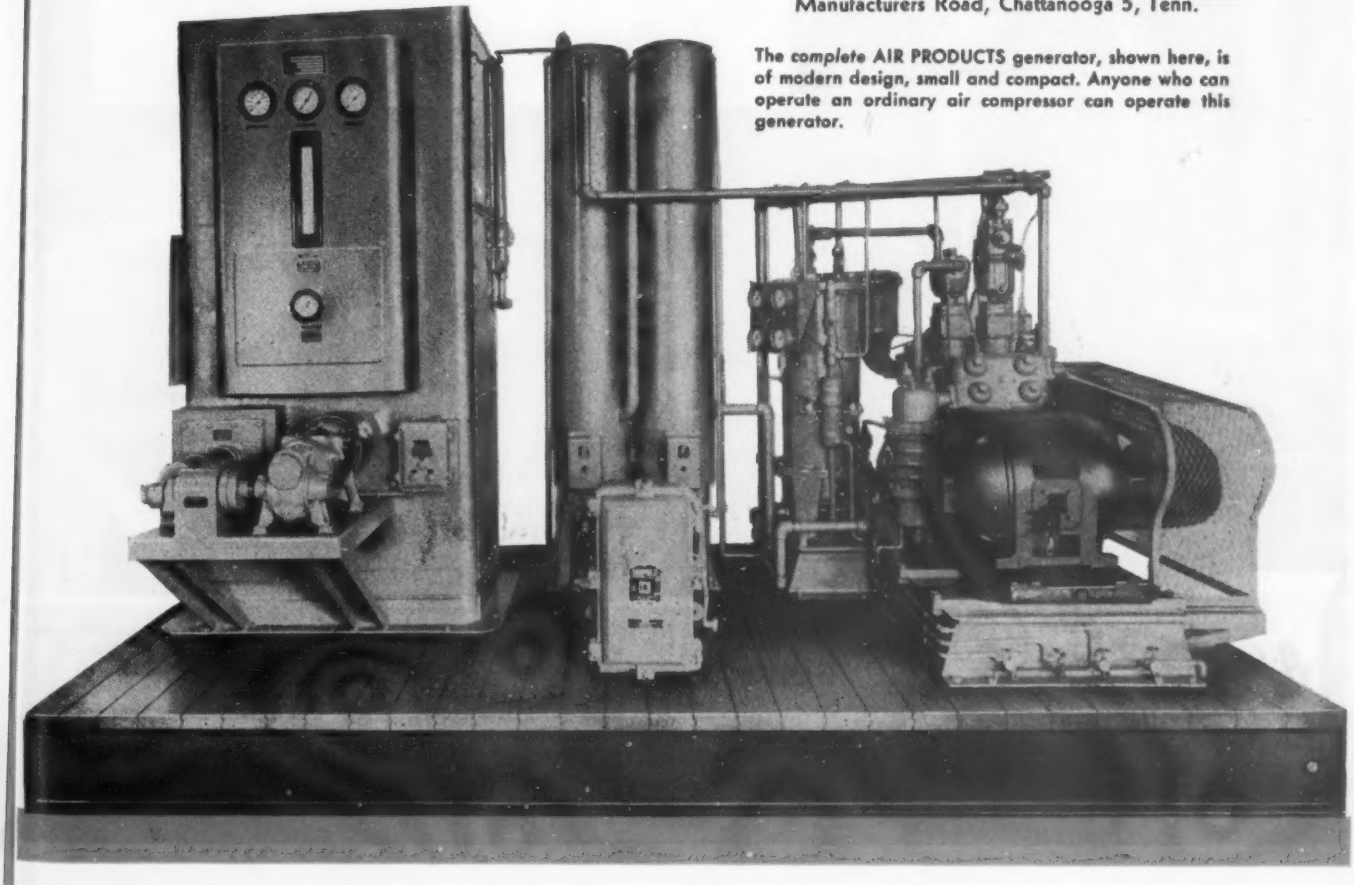
# YOUR OWN OXYGEN

You can save up to 60% by making your own oxygen in your own plant with a modern, efficient AIR PRODUCTS oxygen generator. Simple in design, compact and easy to operate, AIR PRODUCTS generators have been thoroughly proven under peacetime and wartime conditions.

Now is the time to put your postwar plans into action. Let our engineers survey your oxygen requirements and show you how you can cut manufacturing costs by using modern AIR PRODUCTS plants for producing your requirements of oxygen, nitrogen and other gases from atmospheric air. No cost or obligation. Write today for specific details.

Air Products INCORPORATED

Manufacturers Road, Chattanooga 5, Tenn.



The *complete* AIR PRODUCTS generator, shown here, is of modern design, small and compact. Anyone who can operate an ordinary air compressor can operate this generator.

# Allis-Chalmers Electrodes Have Got To Be Good!

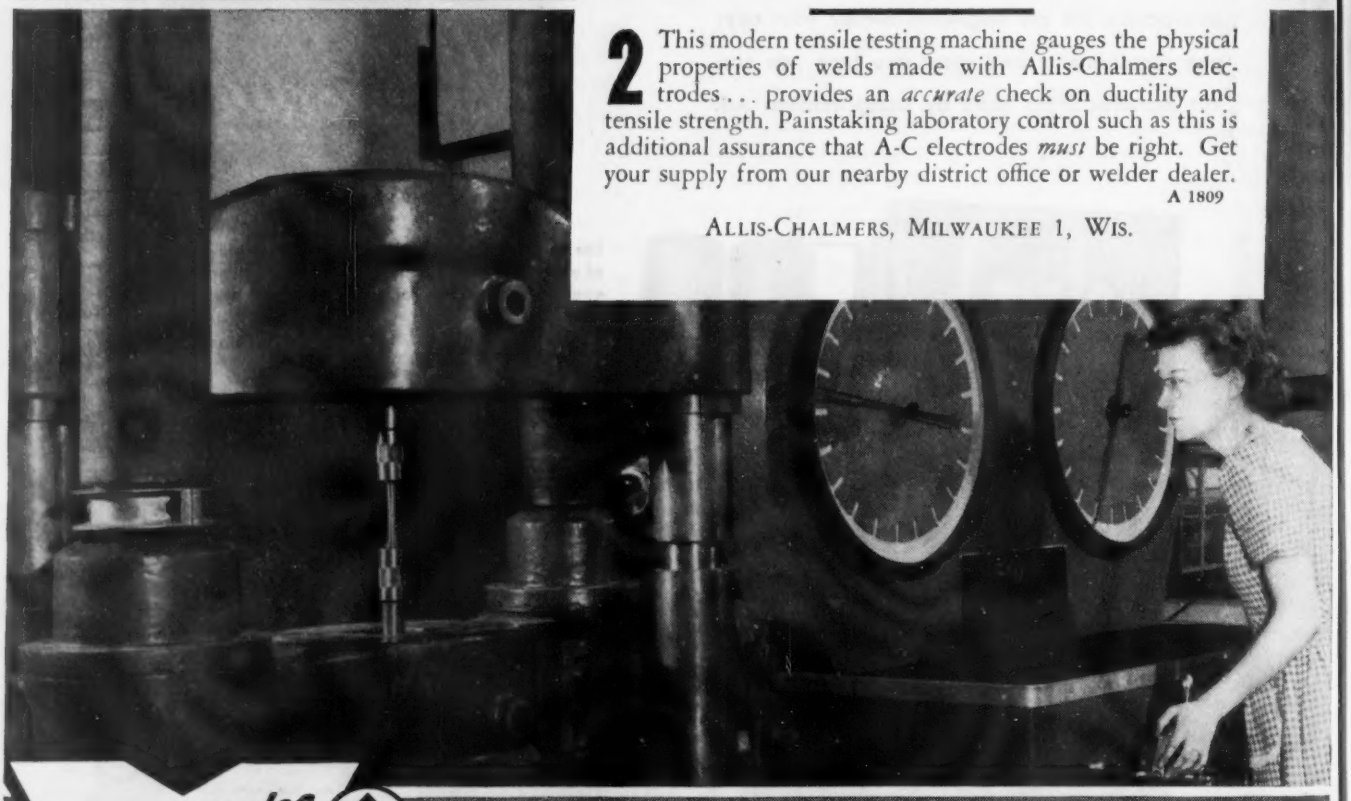
BECAUSE: 1) We use tons of them every day *ourselves*... 2) We constantly test weld metal by X-Ray, tensile machine, metallographic microscope — to assure continual high quality of electrodes.

**1** Being one of the world's largest *users* of welding equipment, we are able to *production-prove* our electrodes in our own Allis-Chalmers shops—under every type of welding condition. Large welding jobs such as this heavy compressor cylinder are everyday routine. Successful welding of this work *depends* on the quality of Allis-Chalmers electrodes. They've *got* to be good!

**2** This modern tensile testing machine gauges the physical properties of welds made with Allis-Chalmers electrodes... provides an *accurate* check on ductility and tensile strength. Painstaking laboratory control such as this is additional assurance that A-C electrodes *must* be right. Get your supply from our nearby district office or welder dealer.

A 1809

ALLIS-CHALMERS, MILWAUKEE 1, WIS.



*A-C Electrodes*
*EASY TO REMEMBER*
*EASY TO BUY*
*Sold by AWS Number*

**HEADQUARTERS FOR WELDING EQUIPMENT**

AMPAC A-C WELDERS

WELD-O-TRON D-C WELDERS

ARC WELDING ACCESSORIES

# JESSOP

## COLD DRAWN—CENTERLESS GROUND

# BAR STEELS

Jessop Specialty Steels are produced with meticulous care, under the most advanced principles and discoveries of Metallurgy—in plants equipped with modern facilities—by generations of experience in Steel Making.

Jessop Cold Drawn Steels have a smooth surface, are accurate to size and section, held within close tolerances, and have materially increased physical properties, particularly the yield point. We produce centerless ground rounds, also centerless ground and polished with real bright finish with close accuracy to size and free from decarburization and surface defects.

**AVAILABLE IN:**

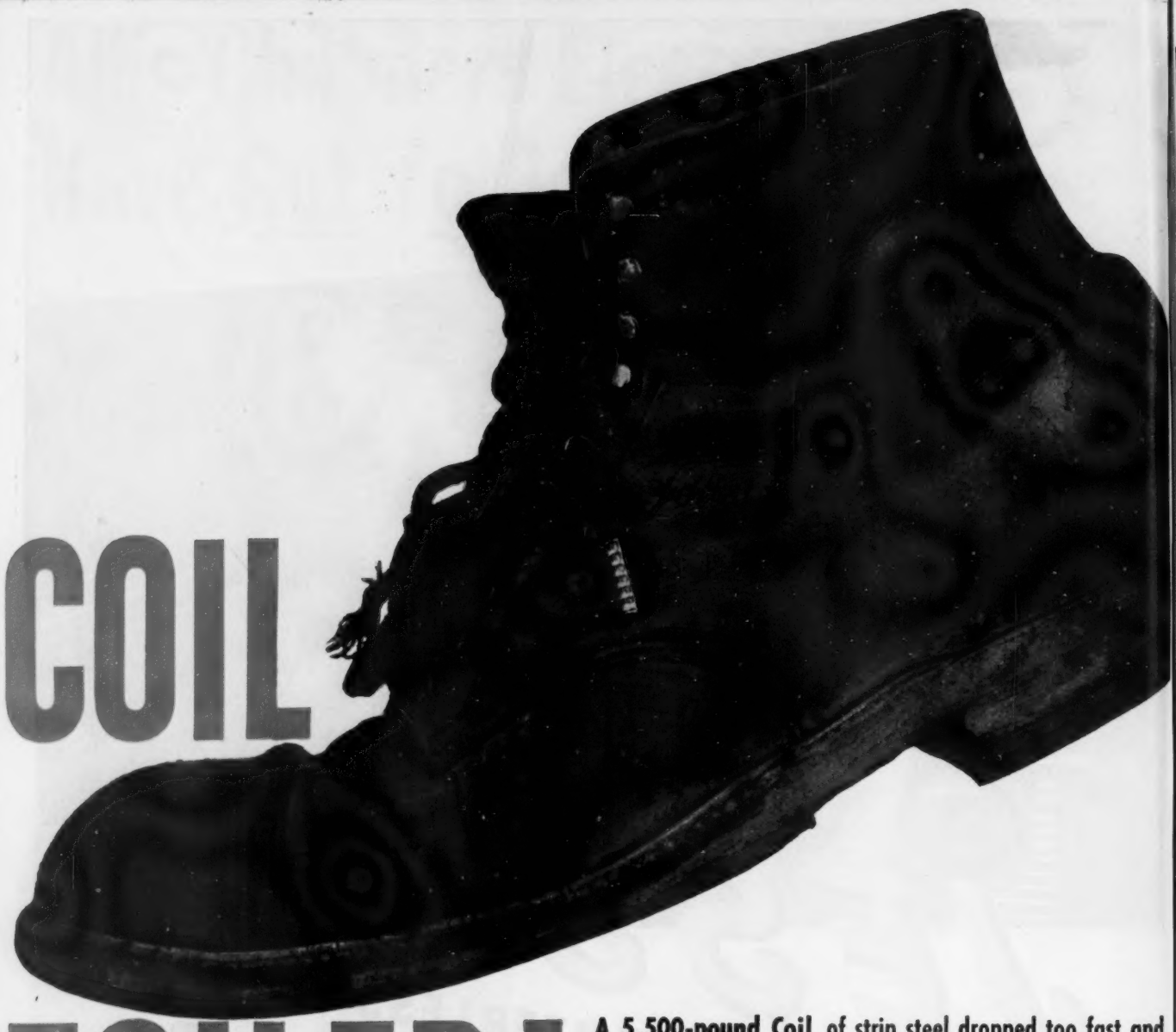
- Drill Rod
- Carbon and Alloy Tool Steel
- Stainless Steel
- Non-Magnetic Steel
- Valve Steel
- "New Process" Cold Header Die Steel
- Jessop "B" Bearing Steel
- Jessop "Extra Tough" Grades
- Special Purpose Steels
- Centerless Ground High Speed Steel
- Cold Drawn "Tip-it" Shank
- Cold Drawn Special Shapes

Deliveries from warehouses and mills. Write for literature on material in which you are interested.

## JESSOP Steel Company

***Head Office and Works*** • **WASHINGTON, PA.**

Established 1901



# COIL FOILED!

**A 5,500-pound Coil** of strip steel dropped too fast and crashed down on the hoistman's foot. But the only injury was a bruised great toe—thanks to the *Lockrim armor-plate steel toe box in his Lehigh Safety Shoe! Every day such accidents convince workers that Lehighs give them "lucky toes." But it takes more than dumb luck to keep toes safe. It takes shoes "engineered to fit into industry." Wherever foot and underfoot hazards are a problem, phone, write or wire Lehigh for authoritative advice. There's no obligation, naturally, for this regular Lehigh Service.

**LEHIGH** ALLENTOWN, PA.
**SAFETY SHOE CO., INC.**

A SOLID STRUCTURE such as a motor shaft rarely fails from the inside out—it fails from the outside in. Moral: get rid of every surface tool mark or irregularity that might someday invite cleavage.

That's what Stan Brothers, above, of Allis-Chalmers Norwood Works is doing. As he painstakingly polishes the shaft—back and forth, back and forth—he works down to a finish that's slicker than silk.

Why does he follow his job so intently? Because in 17 years at Allis-Chalmers Stan has learned that he and every other employe has a *personal* stake in every motor.

He knows that when he helps build a *great* motor for you he helps make a *friend* . . . and that friends are something no company and its workers can have too many of.

*Actually, it was friends that put Allis-Chalmers importantly in the motor business in the first place.*

Years ago, Allis-Chalmers began building motors only because it wanted, to put on heavy-duty equipment it built, better motors than it could buy. Then a few of those motors were sold separately to one customer, a few to others . . .

*And the reputation those motors earned—"You can depend on Allis-Chalmers Motors"—literally forced Allis-Chalmers into building electric motors in volume for the market!*

So the very existence of Norwood Works is proof and reminder to every Allis-Chalmers coil winder, machinist, inspector, welder, brazer, painter, assembler—that *good work catches up with a company just as surely as bad work.*

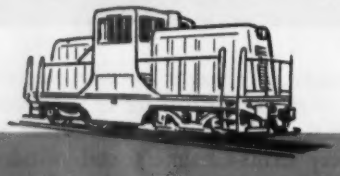
That's why you can expect *good* work in every Allis-Chalmers motor! Allis-Chalmers, Milwaukee 1, Wis.

A 1728

**YOU CAN DEPEND ON ALLIS-CHALMERS MOTORS**

# G-E diesel-electric cuts switching costs

This 65-ton G-E diesel-electric at Port Edwards, Wisconsin has had a 98 per-cent average availability for the last four years



**diesel-electric**
**INDUSTRIAL LOCOMOTIVES**

## WHY IT PAYS TO USE G-E DIESEL-ELECTRICS

**Availability—90 Per Cent Up!**
The diesel-electric carries sufficient fuel for several days' operation, runs for long intervals between overhauls, and requires only periodic inspections.

**Always Ready to Go**
The diesel-electric starts on the press of a button. No unproductive labor time is required to get locomotives ready for work.

**Fuel Costs Low**
The diesel-electric's high efficiency allows it to operate on a fuel cost that is only a fraction of that of a steam locomotive. Moreover, you don't have to keep the engine running to "keep up steam."

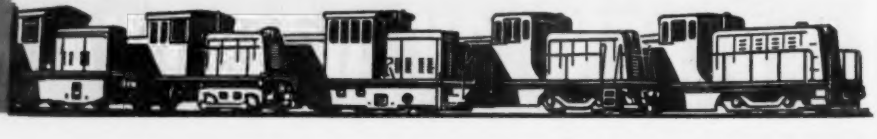
**One-man Operation**
The diesel-electric needs only a one-man crew, as against two usually required on a steam locomotive.

**Maintenance Simplified**
The diesel-electric has no boiler, firebox, nor heavy reciprocating parts, thus greatly simplifying maintenance.

**Fire Hazards Reduced**
The diesel-electric gives off no smoke nor harmful exhaust gas and so is ideal for use around or in buildings. When it replaces a steam locomotive, it lessens fire hazards and building maintenance.

**Track Maintenance Cut**
The diesel-electric is easy on the track because of the smooth, even torque at the wheel rim. Moreover, the diesel-electric's short rigid wheelbase negotiates curves without rail climbing or rail spreading.

**25-TON 45-TON 50-TON 65-TON 80-TON**



# iat large paper mill
# ts in half

Four years ago the Nekoosa-Edwards Paper Company replaced a steam locomotive at its mill at Port Edwards with a 65-ton G-E diesel-electric. Large savings have resulted. The total operating and maintenance expense of the diesel-electric is less than half that of the steamer it replaced. Based on the advantages obtained with this 65-tonner, the Company plans to put another diesel-electric in service to replace a steam switcher which operates at the Nekoosa, Wis. Kraft plant, four miles away.

The diesel-electric handles all of the switching at the Alexander Mill. It moves carloads of logs from the railroad siding to storage piles. From there, trains of ten 60-ton carloads are hauled to the mill, up a grade of .6 per cent for some 2000 feet, with a curve at the upper end. This locomotive also handles outgoing shipments and all transfers between the Port Edwards and the Nekoosa plant. In its four years of service it has had a 98 per cent availability average.

The mill manager of the Nekoosa-Edwards Paper Company, states: "We are as enthusiastic now about the G-E diesel-electric as when we bought it four years ago. Not only does it do more work, in less time, at half the cost of the steamer's operation, but it eliminates the cinder and smoke nuisance throughout the plant. This is particularly important alongside our finishing room, where the paper must be kept clean."

Write for full information on our complete line of diesel-electrics, which are built from the rails up by General Electric.

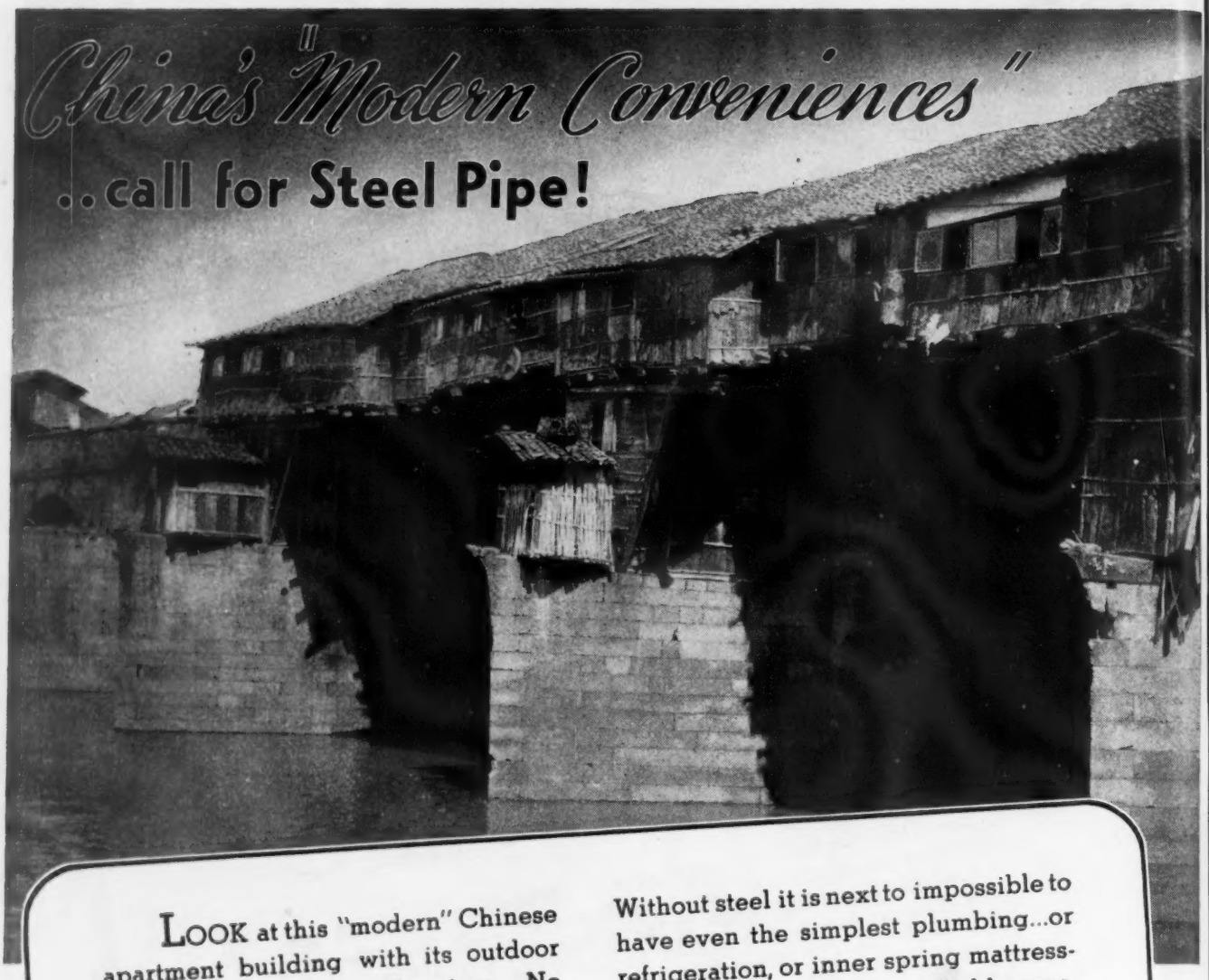
General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

120-16

Buy all the BONDS you can—
and *keep all you buy*

# China's "Modern Conveniences" ..call for Steel Pipe!



LOOK at this "modern" Chinese apartment building with its outdoor facilities overhanging the river. No doubt every bridge houses similar accommodations. And this same river may provide the water supply for all human needs--garbage disposal, laundry, bathing, drinking.

Oriental housing is so different that we call it "quaint" and "picturesque". We could truthfully describe it as "inconvenient", "uncomfortable", "unsanitary"

Why do the people of the East endure this? Do they prefer to drink unclean water, to wash and bathe in primitive ways?

No, of course, not. You know the answer. Their backwardness is due in large part to lack of steel. Without steel it is next to impossible to have even the simplest plumbing...or refrigeration, or inner spring mattresses, or scores of other household accessories that help make living in America a joy instead of a burden.

America's well-being depends on steel. When war's demand is ended, there will be steel enough for present American homes to be modernized and new ones built...with modern conveniences never even known before.

One way in which we Americans can contribute to lasting peace is to help other peoples of the world to appreciate and enjoy the high standards of living that steel makes possible.

QUALITY YOUNGSTOWN SERVICE

**YOUNGSTOWN**

**THE YOUNGSTOWN SHEET AND TUBE COMPANY**

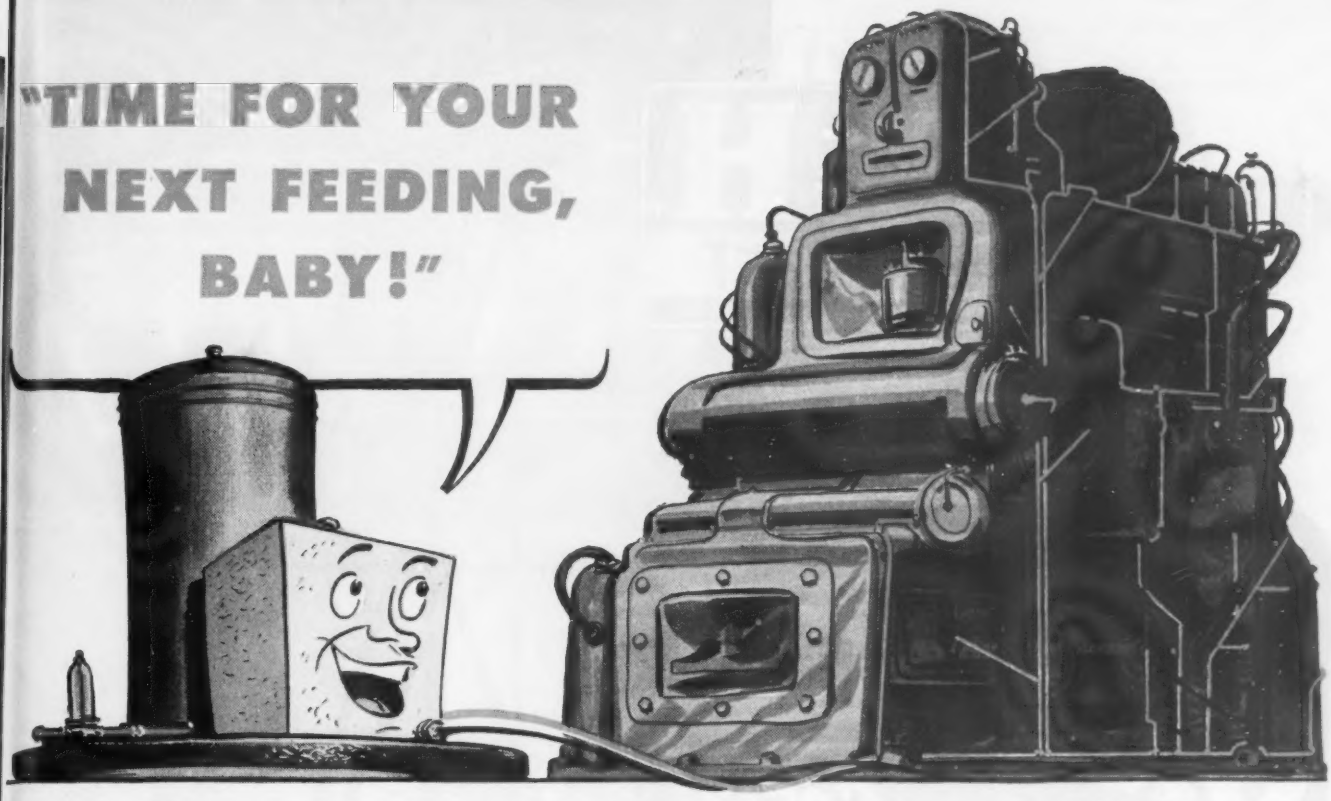
YOUNGSTOWN, OHIO

Manufacturers of

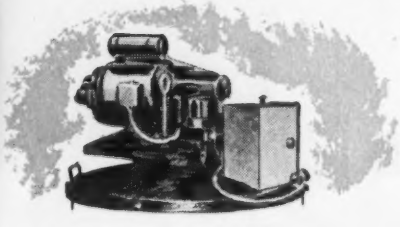
CARBON · ALLOY AND YOLOY STEELS

Pipe and Tubular Products · Sheets · Plates · Conduit Bars · Coke Tin Plate · Electrolytic Tin Plate · Rods · Wire · Nails · Tie Plates and Spikes

# "TIME FOR YOUR NEXT FEEDING, BABY!"



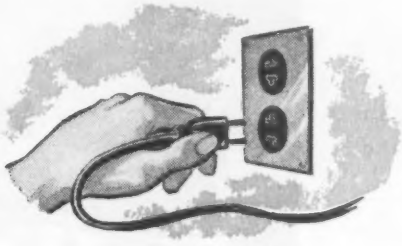
It doesn't look like much—that little box. But, it can keep a $30,000 machine's bearings from freezing with the heat! It's as simple and accurate as the electric clock in your kitchen. And, unlike a human being, it can't make costly mistakes. What is it?



## "LUBRICATION BY THE CLOCK"

1 Another innovation by Alemite, world's authority on modern lubrication. It's a new development in pumping mechanisms for centralized lubrication systems that will mean savings of millions of dollars in every field of industry.

Fully automatic, it once and for all eliminates the possibility of costly human error. It automatically assures the positive, safe lubrication of scores of machine bearings at *any* set interval of time without aid. The only attention needed is the changing of empty lubricant drums for full ones.



## SET IT! PLUG IN! FORGET IT!

2 The mechanism in the box can be set to lubricate at any time interval you choose. Plug the cord into an electric socket and forget it! From then on the lubrication of the machine is in the hands of the time clock.

## "SQUAWK!" "HELP" "DANGER"

3 As a further safeguard for machines, a "howler" warns noisily and flashes a red light when lubricant drum is empty. Absolutely nothing is left to chance.

* * *

Alemite Automatic Centralized Lubrication is available with both electric and pneumatic pumps. By eliminating costly repairs caused by "hit-or-miss" lubrication, these units can quickly pay for themselves.

**ALEMITE**

REG. U.S. PAT. OFF.

*First in Modern Lubrication*

CONSULTATION • EQUIPMENT • LUBRICANTS

ENGINEERING — MAINTENANCE

Another Product of STEWART WARNER

## SEE HOW "LUBRICATION BY THE CLOCK" WORKS . . . RIGHT AT YOUR DESK!

Without obligation, have an Alemite Lubrication Specialist explain "Lubrication by the Clock." Have him demonstrate the four new Alemite Centralized Systems right in your office, with ingenious, transparent working models. These systems can be adapted to almost any machine, large or small, and handle *oil or grease.*

With Alemite Centralized Lubrication, you can end failures of lubricated parts, cut lubrication time more than 95% . . . cut costs of lubrication nearly 98%. Because machines need not stop for lubrication you add "M.P.T."* to your plant. That's a competitive advantage that's well worth looking into. Write —Alemite, 1879 Diversey Parkway, Chicago 14, Illinois.

**More Productive Time*

# P&H ZIP-LIFT

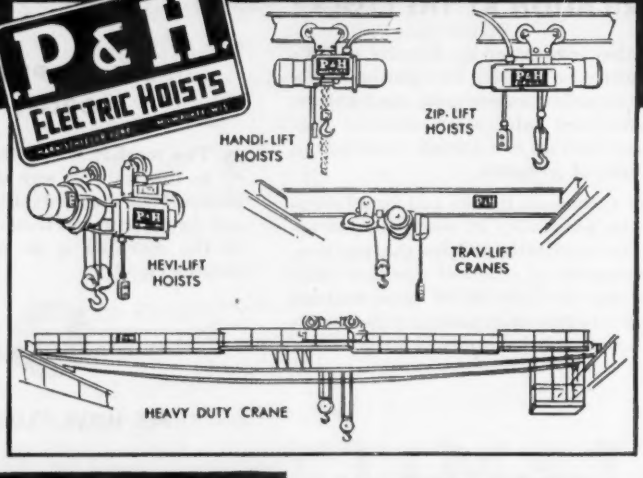
HARNISCHFEGER CORP. MILWAUKEE, WIS.

## THERE'S ONLY ONE WAY TO *Lower Costs!*

Nowadays, there's only one sure way to lower costs — *more production per man-hour!* And "thru-the-air" materials handling is a proved method of freeing skilled hands from *un*productive work.

Take the P&H Zip-Lift. With this modern wire-rope hoist, your production man never wastes his energy — or skill — on load-lifting. He just presses buttons . . . and his loads are carried, lifted, lowered and placed with smooth, fast efficiency. Traveling "thru-the-air," they move *direct*, without congesting aisles.

Many of your materials can move with this same economy — from raw to finished state — and without costly rehandling. It's this speed and ease which have enabled Zip-Lifts to pay for themselves *twice over* in a single year. Let them work to lower your costs! Ask a P&H Hoist Engineer to look over your handling needs . . . or write us for Bulletin H20-2.



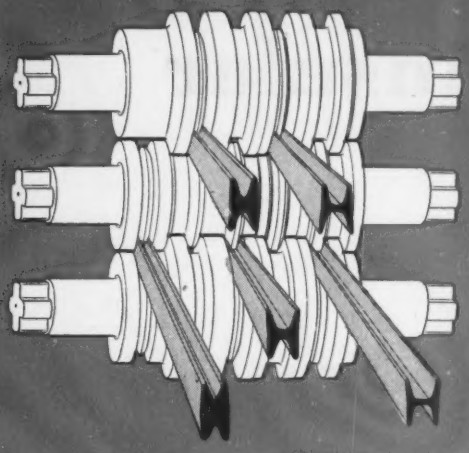

**P&H ELECTRIC HOISTS**

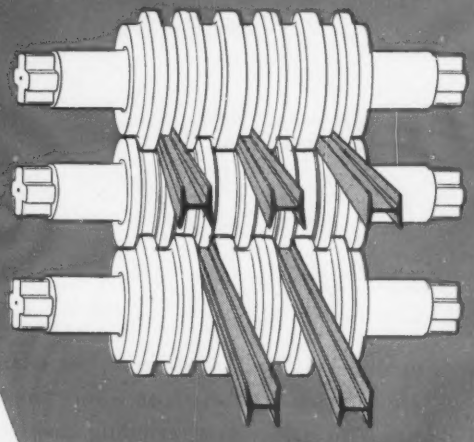
4411 W National Avenue,
Milwaukee 14, Wis.

**HARNISCHFEGER CORPORATION**

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

# ROLLING TECHNIQUE . . .



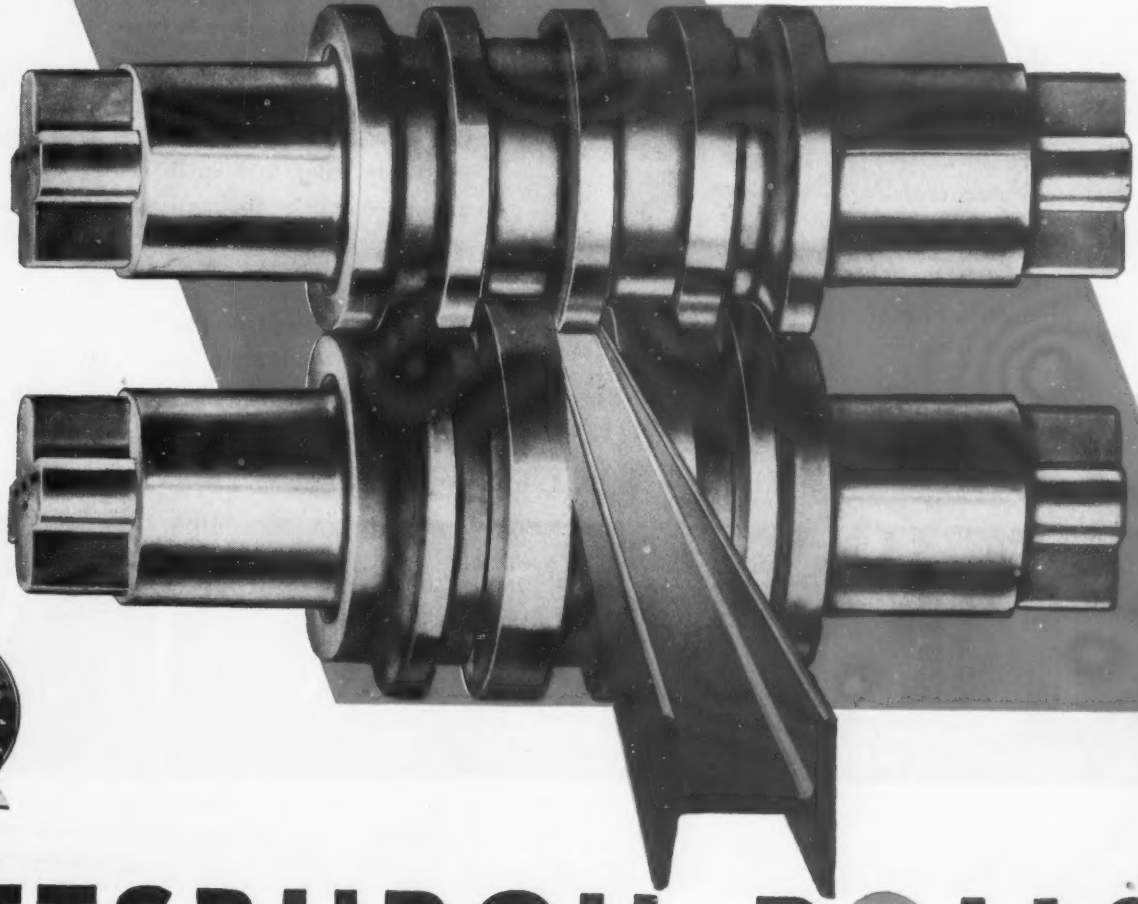


# "H" Beams

Modern high speed rolling mill production on "H" beams and other structural shapes is the result of improvements in operating methods placed in the skilled hands of those who are responsible for the increased tonnage and higher quality specifications demanded by present day requirements.

Pittsburgh Rolls, with three-quarters of a century of roll-making experience and satisfactory performance behind them, can be relied on to deliver the production of highest quality for which high speed modern mills are designed *at less cost per ton of steel rolled.*

**PITTSBURGH ROLLS**
**Division of Blaw-Knox Company**
PITTSBURGH, PA.



75 YEARS EXPERIENCE 1870 1945

# PITTSBURGH ROLLS

# Depend on Peninsular for the "Wheels of Industry"

WHEN really tough grinding problems arise, manufacturers everywhere depend on Peninsular!

This is only natural, for Peninsular has long been recognized as a pioneer in the development of new materials for abrasive wheels—new methods for their manufacture—new means for their application to industrial problems.

In the steel industry for example, a basic advancement by Peninsular actually reduced the production time of stainless steel conditioning as much as 50%.

Right now—through endless study and experiment—Peninsular engineers and laboratory men are carrying on their search for "new and better ways" to reduce your grinding costs in the peacetime manufacturing days to come.

### A STANDING INVITATION

Our expert staff of factory and field engineers are ready today to help in your postwar preparation—with a production, engineering and cost analysis service beyond any offered up to now in the industry.

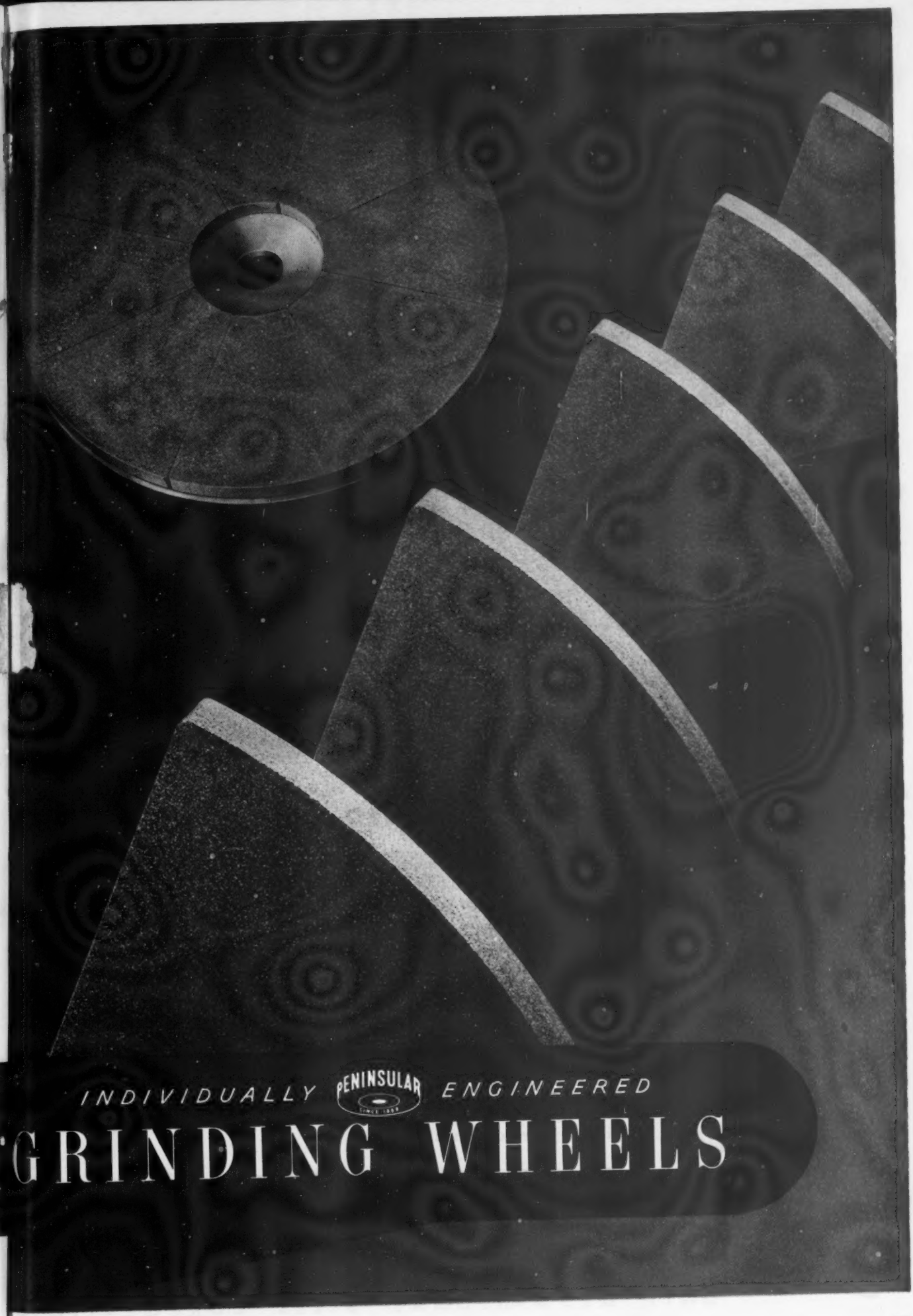
The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Cleveland, Newark, Pittsburgh.

SPECIALISTS IN RESINOID BONDED WHEELS

PENINSULAR GRINDING WHEELS

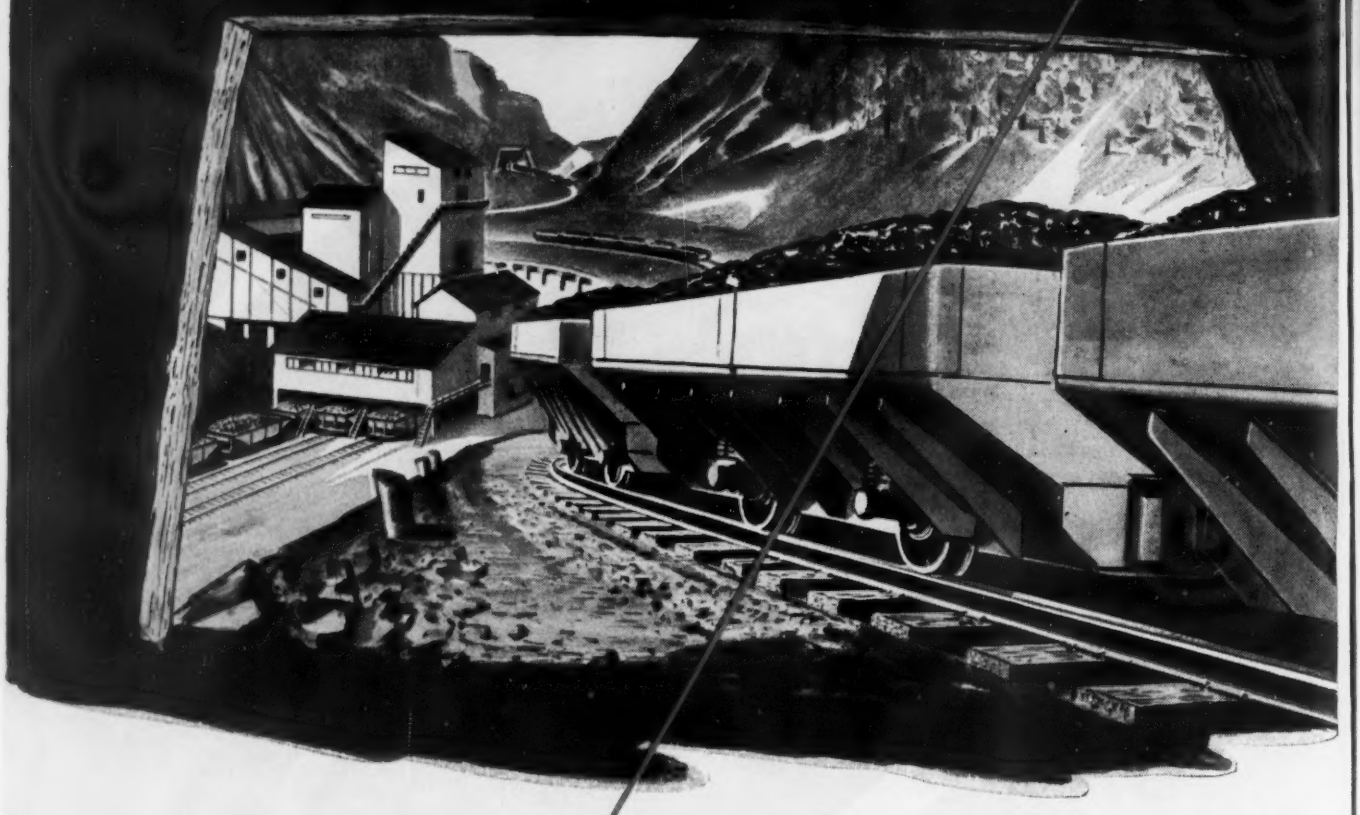
SINCE 1889

*Large segmental wheels for disc grinding.*


INDIVIDUALLY PENINSULAR ENGINEERED
GRINDING WHEELS

# DEADWEIGHT TAKES A K.O.—

N-A-X
LOW-ALLOY STEELS



## when these FINE-GRAINED STEELS take over

In N-A-X low-alloy steels, manufacturers of mining equipment have what it takes to *knock out deadweight* in the design of cars, elevators, conveyors, tipples, screens and stripping shovels.

It's the old "one-two punch" proposition. N-A-X High-Tensile provides the extra strength in stressed members to permit more efficient design, lighter construction. N-A-X 9100 Series steels do the same for constructional parts that call for accurate heat-treatment, with abrasion-resistance an important factor.

Take advantage of the great strength, exceptional ductility, good corrosion-resistance, excellent weldability and high resistance to impact, wear and fatigue that these fine-grained N-A-X low-alloy steels offer. Put N-A-X High-Tensile and N-A-X 9100 Series steels on the job to cut down deadweight, step up payload and increase the life of your equipment.

GREAT STEELS FROM GREAT LAKES

**GREAT LAKES STEEL**
*Corporation*
**N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN**
UNIT OF NATIONAL STEEL CORPORATION

# LODGE & SHIPLEY LATHES at work

## machining spur pinion shafts FOR A BULLARD WAR CONTRACT

● As a machine tool builder, Bullard fully appreciates the many advantages a manufacturer obtains by using the latest machine tool developments.

To help assure greater speed, precision and quality in the production of their own machine tools, and their sub-contracting work, Bullard utilizes a big battery of Lodge and Shipley's newest 18″ and 20″ Engine Lathes.

These L & S Lathes are a great step forward in design and performance—meet the most exacting requirements of forward-looking manufacturers like Bullard.

Completely new from headstock to tailstock, these powerful lathes set new standards for output, accuracy and smooth operation. A wide range of spindle speeds, feeds, and threads assure maximum adaptability . . . permit full use of the cutting possibilities of all types of tools. Many other new features contribute to their superior lathe performance.

L & S Engineers will show how your work can profit by these new lathe developments. For details and specifications on L & S 18″, 20″ and 22″ Engine, Tool Room and Manufacturing Lathes, write on your company letterhead for Bulletins No. 474, 482, 605.

THE LODGE & SHIPLEY MACHINE TOOL CO.

CINCINNATI 25, OHIO, U. S. A.

L & S LATHES

ENGINE—TOOL ROOM—AUTOMATIC—OIL COUNTRY LATHES

# TENSION RIGHT...EFFICIENCY HIGH... MACHINES PRODUCING...ALWAYS

You always *know* belt tension is right on a Flat Leather Automatic Tension drive. The pivoted motor base regulates tension automatically — high when the load is heavy, low when the load is light. There is no gradual, undetected slackening of the belt until it wears out from heat due to slippage!

Efficiency remains high above or below rated capacity (and most drives *do* run at less than rated capacity most of the time). A flat leather belt on a pivoted motor base drive operates at close to maximum efficiency from 50 to 150% of rated capacity at rated tension. Other short-center drives lose efficiency rapidly at loads either lighter or heavier than rated.

Production continues, uninterrupted, because the F.L.A.T. drive is never stopped for base adjustment.

Ask your Graton & Knight distributor for a demonstration.

Dependable, trouble-free service on a Flat Leather Automatic Tension drive is provided by "Research" Leather Belting, manufactured by processes which make it ideal for drives operating at higher speeds, over short centers and small pulleys.

Its greater pliability means it can withstand the constant flexing. Its "built-in" pulley grip means less tension required to deliver full power without slip. No idlers are necessary.

A "Research" Leather Belt on a F.L.A.T. drive will outlive a rubber V-belt on a corresponding drive by better than 2 to 1. Write Graton & Knight Company 322 Franklin St., Worcester 4, Mass., for new, free Belting Manual.

GRATON AND KNIGHT

## Research Leather Belting

**from Graton & Knight's line of leather belting—the most complete for all applications. Manufactured under one control from green hide to finished product. Branches and distributors everywhere. Look under "Graton & Knight" in "Belting" section of Classified Telephone Directory or THOMAS' REGISTER.**

# FOR FAST *Changeover!*

IN $\frac{1}{4}$ THE TIME

IN $\frac{1}{3}$ THE COST

## SPECIFY ALGOMA TEMPLATE DIES

### *SUPER-FAST PRODUCTION WITH STAMPINGS*

Want to change over to new production fast? Try Algoma Template Dies.

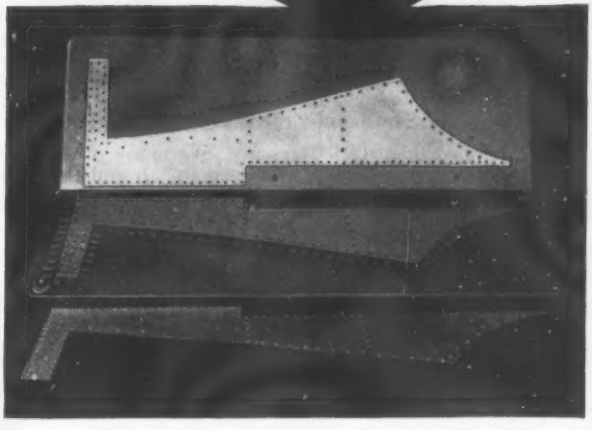
Sawed from special alloy steel, sheared and filed to size, hardened and welded to inexpensive back-up plates . . . Algoma Template Dies enable you to get into production super-fast with minimum down time.

Pierce punches of hardened and drawn tool steel pressed into the blank die for piercing the holes in the part are individually replaceable . . . a feature that means longer life for Algoma Template Dies.

Whatever your die problems—check with Algoma! No drawing is required. Just tell us the metal and the gauge, the size of the run, and send a template of the shape. We'll quote quickly . . . and you'll be off to a fast start.

### *TELL US 3 THINGS FOR FAST ACTION*

The metal, the gauge, the size of the run. That's all the information we need in addition to a template of the part. We'll give you a figure quickly . . . and you'll be in production before you know it.



**TRY ALGOMA**

**HYDRO-FORM BLOCKS, TOO!**

Algoma Hydro-Form Blocks are made to your specifications from hot-rolled boiler plate machined and polished to prevent scratching of parts. Mounted in the press with rubber blocks, they are furnished complete with pilot pins for location of parts.

*FOR A HEAD START, BE WISE*
*SPECIFY ALGOMA TEMPLATE DIES*

# Algoma · PRODUCTS ·

3080 EAST OUTER DRIVE • DETROIT 12, MICHIGAN

# NOW CRUCIBLE STEEL WAREHOUSES DELIVER

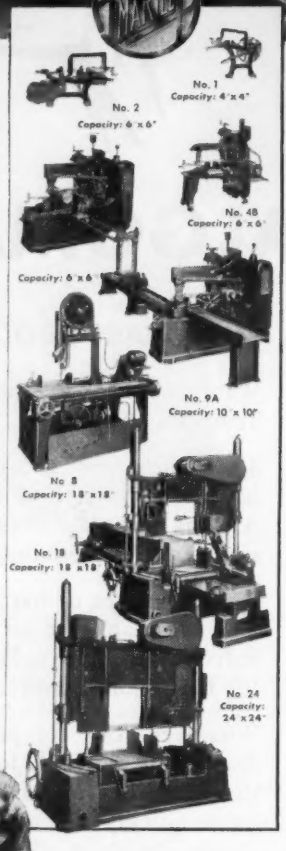
## —any size, any length "from stock"

With their modern high speed MARVEL Hack Saws the Crucible Steel Company's Warehouses can deliver orders "from stock", whether for a few miscellaneous lengths, a thousand alloy steel gear blanks, a single tool steel disc 18 inches in diameter, or other lengths or slices accurately cut-off from any type bar stock.

In their Indianapolis quick service Warehouse shown above they have two No. 9A MARVEL Automatic Bar Feed Sawing Machines (capacity 10" x 10") and one No. 18 MARVEL Universal Roll Stroke Hydraulic Saw (capacity 18" x 18"). The high speed 9A will cut-off identical pieces from single or nested bars automatically with no more operator attention than an automatic screw machine requires. They can be stopped at any point in a quantity run; a miscellaneous cut made; and the quantity run resumed by simply disengaging and re-engaging the automatic feed. The No. 18 "Roll Stroke" Hydraulic Saw handles the heavy stuff—will quickly cut-off the largest and toughest bars.

The Crucible Steel Company, like many others, have found the MARVEL Hack Saw method fast, accurate and economical; and that it requires no special skill on the part of the operator.

For quick reference see our section in Sweet's File - Mechanical Industries or write for catalog.



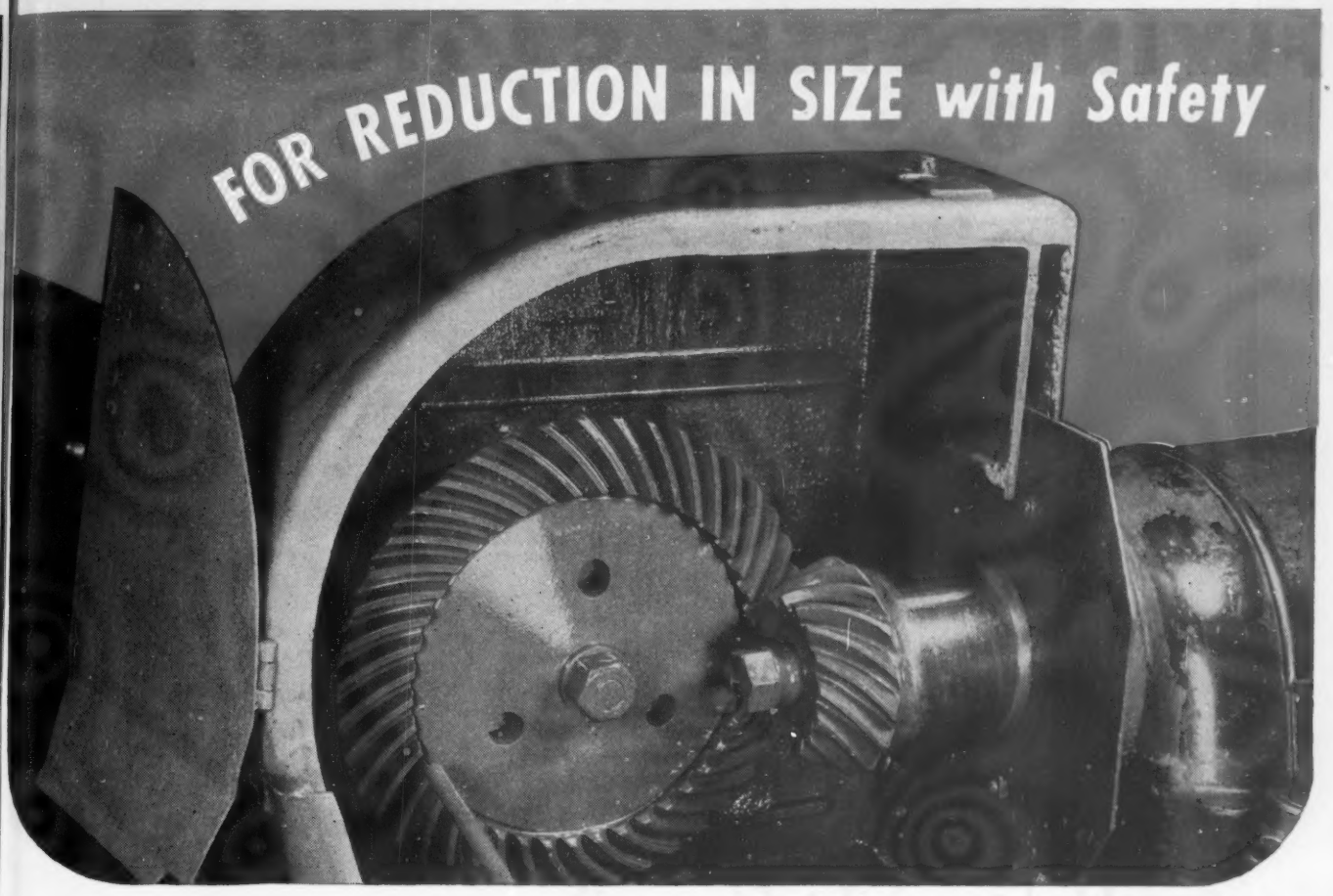

**ARMSTRONG-BLUM MFG. CO.**

*"The Hack Saw People"*

**5700 Bloomingdale Ave. Chicago 39, U. S. A.**

*Eastern Sales Office:*

225 LaFayette St. New York 12, New York




# —no other material can equal ALLOY STEELS

When reduction in size of gears, such as those being lapped above, or other working parts, is indicated to save weight or space, or to improve performance, the safe answer is alloy steels.

These fine steels have the highest strength values of all materials. They also provide the maximum strength per pound of material involved.

And that isn't all. They rank at the top in toughness. They have the ability to resist severe shocks and concentration or reversal of stresses. And they retain their high strength over long periods of time—thus resisting the attack of fatigue.

Alloy steels are unequalled in their uniform and predetermined response to hardening treatments —providing any depth of hardness desired and insuring against soft spots in wearing surfaces.

Alloy steels resist both sub-zero cold and red hot temperatures. They insure against embrittlement and failure due to conditions of extreme cold. They also can be used successfully where they must operate while extremely hot.

If you want to reduce weight or size—to insure safety—to lengthen life of trouble-free service—ask Republic, world's largest producer of alloy steels, what these fine steels can do for you.

**REPUBLIC STEEL CORPORATION**
*Alloy Steel Division • Massillon, Ohio*
**GENERAL OFFICES • CLEVELAND 1, OHIO**
Export Department: Chrysler Building, New York 17, N. Y.

*Republic*
**ALLOY STEELS**

**Other Republic Products include Carbon and Stainless Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing**

# FLYING STEEL CASTINGS

## For Lightweight Strength

Most of us think of aircraft in terms of light metals. But the modern plane has hundreds of parts that call for the extra strength and rigidity of steel.

Steel castings supply these requirements, with thin-section castings having tensile strength of 175,000 p.s.i. and higher, and whatever other properties of steel may be desirable.

Thinking in terms of your own production, steel castings will deliver to you exactly the prescribed-in-advance properties that will best do the job.

Steel castings will give you strength with lightness and proper weight distribution. And resistance to heat or cold or corrosion or impact. And the economy of finishing and assembly you can secure only through the casting process.

The steel castings industry—with years of careful research and broad experience—is ready to work with you. Ask your steel foundryman, or write to Steel Founders' Society, 920 Midland Bldg., Cleveland, Ohio.

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

# STEEL CASTINGS

# WHEN YOU "Call Salem"

★ **A SALEM HEATING ENGINEER CALLS ON YOU . . .**

You outline requirements and he offers suggestions.

★ **VISUAL SPECIALISTS GO TO WORK . . .**

Draft preliminary ideas for checking by you.

★ **LABORATORY EXPERTS GO INTO ACTION . . .**

Any new ideas we may recommend in your design receive a thorough testing.

★ **HEATING ENGINEER CHECKS DATA WITH YOU . . .**

Presents rough drafts and results of tests.

★ **FINAL RECOMMENDATION AND PROPOSAL DRAWN UP . . .**

These data incorporate Salem's recommendations based upon your specific heating requirements.

★ **GO AHEAD . . .**

You approve plan and we start to build.

★ **PREPARE DRAWINGS . . .**

Salem's staff of draftsmen makes up working blueprints.

★ **FURNACE TAKES SHAPE . . .**

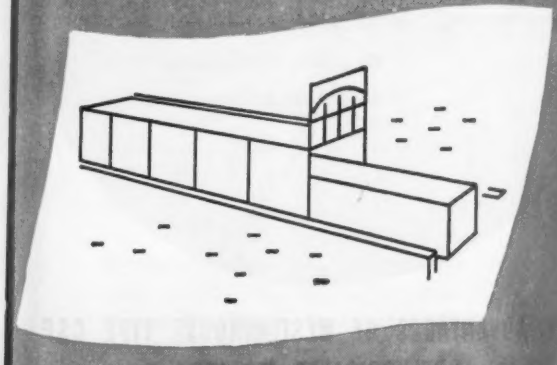
Paper work finished, we start construction.

★ **INSTALLED AND CHECKED IN YOUR PLANT . . .**

After installation, Salem engineers test the furnace in your plant and instruct your representatives in its operation.

★ ★ ★

*Thorough planning and workmanship assure you the kind of heating furnace and equipment you need for efficient operation. CALL SALEM for any type, size, or style of heating furnace.*

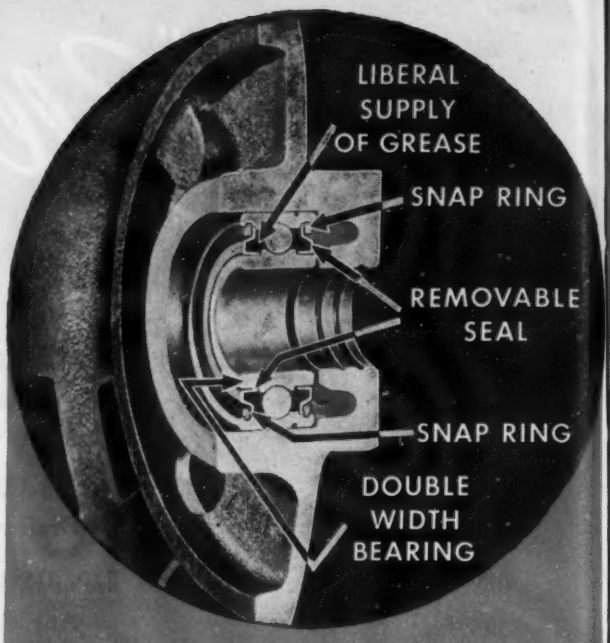


# SALEM
ENGINEERING CO.
SALEM, OHIO

*Engineered Heat*

SALEM ENGINEERING COMPANY

# ANOTHER WESTINGHOUSE MOTOR "FIRST" WHICH REDUCES INDUCTION MOTOR MAINTENANCE TO A NEW LOW... NOW STANDARD ON TYPE CSP MOTORS, 3 HP AND BELOW




Install now... lubricate once between 1945 and 1955! Think of what this means in terms of man-hours saved—because you can forget lubrication of Type CSP Motors for *5 years* or more after they are installed.

Prelubricated ball bearings are not new in Westinghouse Motors. They have been proved in thousands of textile motor applications—which have run continuously for 7 years and been found in perfect condition after that time.

The CSP motor is another example of the extensive and continuous Westinghouse developments which have contributed to induction motor design. For full information, call your Westinghouse office—ask for DB-3100-CSP, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-21330

# only ONE lubrication...

## BETWEEN 1945 AND 1955!

This "PRELUBRICATED" Label (on end bracket of all CSP motors up to frame 225)

your assurance of:

- No overgreasing
- No unreplaced plugs
- No grease seepage into windings
- No "skipped" bearings
- No grease contamination
- Simplified lubrication schedules

## OTHER ADVANTAGES OF WESTINGHOUSE TYPE CSP PRELUBRICATED MOTORS

- Longer grease life
- TUFFERNELL Insulation
- *Die-cast Rotor* with oversize fan
- *Dynamically Balanced Rotor*
- *Liberal Through-Ventilation*—air enters front and leaves at drive end of motor

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

# TYPE CSP MOTORS

# Design that part in ArmaSteel*

The versatile metal that speeds production for war and essential civilian goods

***These PLUS advantages can be applied to your production***

**ArmaSteel** is cast to conform closely to final shapes.

**ArmaSteel** responds to selective hardening.

**ArmaSteel** is available in any yield strength up to 90,000 pounds per square inch.

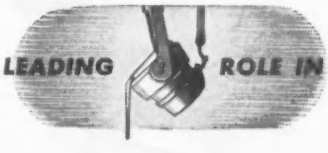
**ArmaSteel** increases the number of parts finished per tool grind as much as 100 per cent.

**ArmaSteel** provides 10 per cent to 50 per cent better machinability than steels of comparable hardness.

ArmaSteel, proved in hundreds of war uses, can shorten the time lag from planboard to finished product when essential civilian manufacturing gets the go-ahead.

ArmaSteel speeds production because of its exceptional machinability . . . and because it is cast to conform closely to final shapes. Machining time is cut, manufacturing cost lowered, scrap loss reduced.

Leading manufacturers have proved ArmaSteel an exceptionally versatile material, adaptable to varied requirements and lending itself to time-saving techniques. Investigate the advantages of ArmaSteel. Specify ArmaSteel in returning to civilian production.

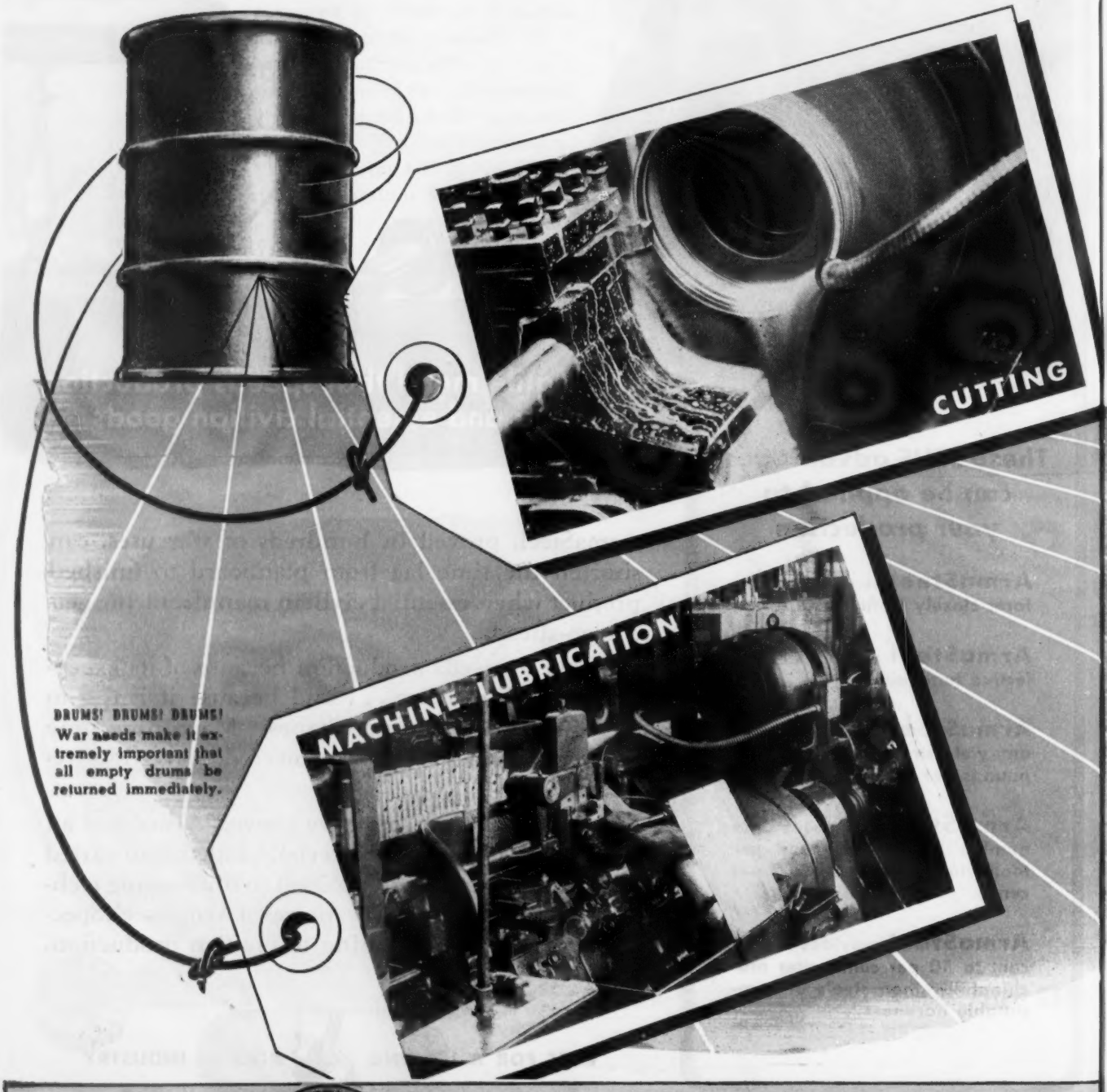



***KEEP BUYING WAR BONDS***

**SAGINAW MALLEABLE IRON DIVISION OF GENERAL MOTORS**
**SAGINAW, MICHIGAN**

*Reg. U.S. Pat. Off.

# THE 2-JOB OIL




**DRUMS! DRUMS! DRUMS!**
**War needs make it extremely important that all empty drums be returned immediately.**

INDUSTRIAL TYCOL OILS-GREASES

## TYCOL INDUSTRIAL

*ENGINEERED FOR EVERY*

# THAT DOES *Both Jobs Better*

# TYCOL

## DUAL PURPOSE OIL

Yes, you use only *one* oil for *both* cutting and machine lubrication, and you get better results both ways.

**Better cutting performance** because Tycol "Dual Purpose" increases speeds, feeds, and tool life . . . minimizes build-up on cutting tools.

**Better machine lubrication, too,** because this unique oil gives thorough protection to gears and bearings . . . and it won't corrode nor harmfully affect ferrous or non-ferrous metal parts.

**What's the reason for this two-way superiority?** Tycol Dual Purpose Oil contains precisely enough sulphur for high speed cutting, but the sulphur is in *combined* form. It won't separate, won't filter out. That's what makes Tycol Dual Purpose such an effective lubricant for automatics and other machines, as well as an exceptional cutting oil.

Why not see for yourself how Tycol Dual Purpose can step up cutting speeds and improve machine performance in your plant? For complete information call or write any Tide Water Associated office.

**FREER CUTTING, LONGER TOOL LIFE**

By minimizing build-up on cutting tools, Tycol "Dual Purpose" permits faster cutting — lengthens tool life between grinds.

**PROTECTS BEARINGS AND GEARS**

Won't corrode, or harmfully affect copper or copper alloy machine parts. Result — lower maintenance costs.

**EXCELLENT WITH CARBIDE TOOLS**

Tycol "Dual Purpose" brings out the best cutting performance of carbide tools, without attacking the binder.

UBRICANTS
ERVICE NEED

TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE · NEW YORK 4, N. Y.

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TIDE WATER OIL COMPANY OF CANADA, LTD.
TORONTO · MONTREAL

# Specify Ⓛ 46 for "Triple Protection"

**LEBANON Ⓛ 46**

CHEMICAL ANALYSIS

Cr. 25% Ni. 20% C. 0.25 Max.

PHYSICAL PROPERTIES
(Water Quenched for Corrosion Service)

| | |
|---|---|
| Tensile Strength | 70,000 |
| Yield Point | 30,000 |
| Elongation in 2" | 45% |
| Brinell Hardness | 130 |

## RESISTS HEAT, CORROSION AND PRESSURE IN COMBINATION

Where service conditions combine heat, corrosion and pressure, application of Lebanon Circle Ⓛ 46 should be thoroughly considered. Castings of this alloy provide outstanding service in such exacting installations as gas turbines, superchargers and in return bends where temperatures run above 1500° F. and where pressures are high.

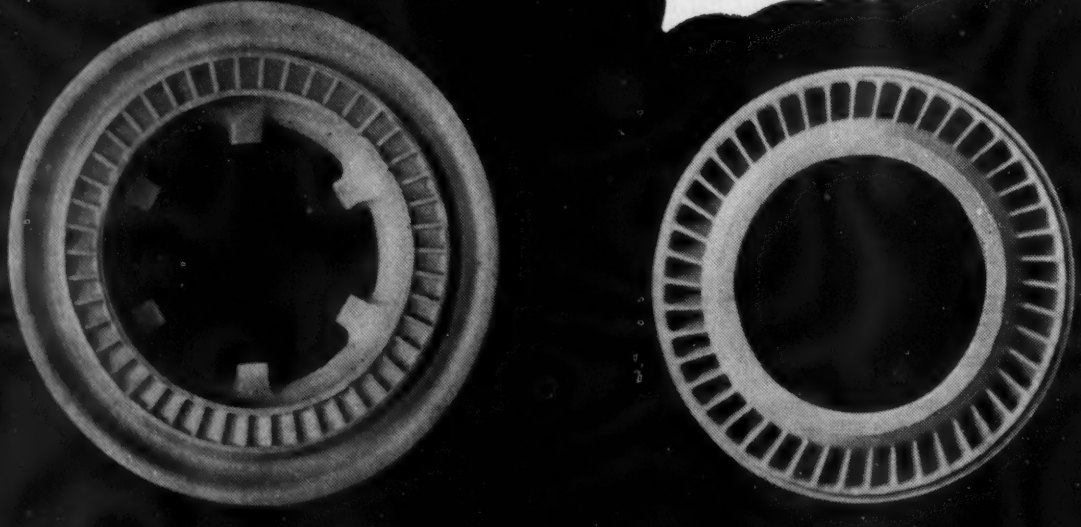
Circle Ⓛ 46 maintains strength and rigidity at all temperatures up to 1850° F. . . . resists fuels relatively high in sulphur . . . provides scale resistance superior to that of any 18% chrome and 8% nickel alloy.

Lebanon foundry engineers and metallurgists will gladly help you determine just where and how the use of Circle Ⓛ 46 will contribute to increased life or improved performance of your equipment. Write us and briefly outline your problems—or arrange for consultation.

**LEBANON STEEL FOUNDRY** **LEBANON, PA.**

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

Nozzle Diaphragm Castings.
Cast from Lebanon Circle Ⓛ 46.



**Lebanon ALLOY AND STEEL Castings**

# ENGINEERS . . . PRODUCTION MEN

## Get this *New Free Book* on BLIND RIVETING!

THIS comprehensive illustrated manual explains in detail the unique operating principles of the Huck Blind Rivet and the advantages provided by this design—advantages proved by wide application in aircraft construction and similar fields. *Complete instructions and data* are given for selecting the proper rivet length, drilling and dimpling the material, driving the rivets, and inspection of driven rivets from the accessible side of the work. Other sections cover operation of the rivet gun and removal of driven rivets.

### *Only* HUCK Blind Rivets Offer *ALL* These Advantages

1. **Positive shank expansion to fill the hole—assures a rigid, fatigue-resistant joint capable of withstanding vibration and reversals of stress.**
2. **Bulbed blind head formation—pulls sheets tightly together; provides adequate surface contact between blind head and sheet, giving great strength and rigidity.**
3. **Positive mechanical lock—rigidly and permanently locks rivet pin to sleeve; gives driven rivet a strength comparable to that of a *solid* rivet.**
4. **Automatic pin break, flush with outer head—no trimming required.**
5. **Quick, easy driving. Jaws of gun hold rivet rigidly centralized; rivet can't wobble, fall out, or move so as to cause improper engagement of the pin by the gun jaws. Complete driving operation is very rapid and requires only one operator.**
6. **Simple and fast inspection of driven rivets—by merely examining the manufactured head on the accessible side of the work.**

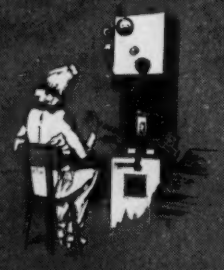
***Free illustrated manual gives full details***

Written particularly for engineers and production men, this new manual will be of interest to everyone concerned with sheet metal assembly problems. *Send for your free copy today*—on your company letterhead, please.

**Huck MANUFACTURING CO.**

**2480 BELLEVUE AVENUE** **DETROIT 7, MICHIGAN**

# THIS IS *Automatic Inspection!*



AUTOMATIC INSPECTION, as performed by Hurletrons, is an automatic method of performing critical inspections by means of electronic-optical equipment. For example, automatic precision gaging to accuracies of .0001" at speeds as high as 150 pieces per minute, together with automatic sorting of rejects.

One type of Hurletron, made mandatory by Ordnance for a particular inspection of an ammunition item, checks critical dimensions while the part is spinning at a prescribed r.p.m. Pieces are handled at the rate of 60 per minute, inspected and sorted entirely automatically.

Hurletrons are machines designed and built to inspect, automatically, such critical dimensions as diameter, length, taper, profile, eccentricity, concentricity, inside diameter and wall thickness, as well as turbidity and transparency, and to provide completely automatic sorting. Electrical characteristics of production items, including voltage, current, resistance, and capacitance, may be determined automatically by Hurletrons.

Hurletronic automatic inspection can be applied to hundreds of peacetime problems, eliminating the human element, speeding up production and substantially reducing production costs. No matter how complex your problem may be, we'd like to discuss it with you . . . without any obligation on your part.

**ELECTRIC EYE EQUIPMENT COMPANY • 11 WEST FAIRCHILD STREET, DANVILLE, ILLINOIS**

# HURLETRON

*Automatic* *Electronic*

INSPECTION • CONTROL • ASSEMBLY

# A few simple rules to conserve carbide tools

## FIRTHITE FIELD SERVICE POSTERS are available for display in your plant

KEEP 'EM SHARP!
OUCH!
FIRST AID
Watch your carbide tools! Don't let them
they break! Change them for resharpening
reasonable number of pieces have been ma
This will give you more pieces per tool. Rem
sharp tools give better accuracy and use less
HANDLE 'EM WITH CARE!
IT'S BEST TO BABY 'EM!
Carbide tool cutting edges should be protected so that they do not come in contact with other tools or metal parts except when cutting. It is best to provide wooden, partitioned boxes for storage. Use plastic dip or tape on the tips.
FIRTH-STERLING STEEL COMPANY
'EM CORRECTLY
-CE -ETTIN'! THANK YOU, SIR!
Carbide tools should have just enough provide free cutting action, AND NO Otherwise you weaken the cutting edg cutting point exactly at the height
WHEN GRINDING DON'T USE TOO MUCH FORCE
HELP!
Don't exert too much pressure against the abrasive wheel when grinding carbide tools. If the wheel is right, light pressure will remove mate suitable rate. Too much pressure
heating and may
FIRTH-STE
BE SURE TO USE THE PROPER TOOL!
FOR SIZE
FOR SHAPE
FOR STYLE
FOR TIP
Carbide tools operate at higher speeds th other metal-cutting tools. Carbide tools always be larger than the steel or alloy they replace. Also, make sure they are correct style, shape, and grade.
FIRTH-STERLING STEEL COMPANY
GRIND 'EM PROPERLY!
TOOL GRINDING RULES
Grinding rules for carbide tools are easily avail- able and should be followed carefully. The right wheel, running in the right direction, preserving correct angles are some of the things to watch. Don't guess—grind carbide tools according to rules.
FIRTH-STERLING STEEL COMPANY
FIRTHITE

The conservation of carbide tools through proper handling and correct usage is essential not only in war time but at any time for best production results and low operating costs.

These Firthite field service posters will help remind your plant operators in simple, easy-to-take, understandable manner, of the right way to make carbide tools do their utmost.

Fill in and mail the coupon for your set of these free, 17" x 22", four-color posters.

**Firth-Sterling**

**STEEL COMPANY**

**OFFICES: McKEESPORT, PA. • NEW YORK • HARTFORD • PHILADELPHIA • PITTSBURGH • CLEVELAND • DAYTON • DETROIT • CHICAGO • LOS ANGELES**

FIRTH-STERLING STEEL CO., Dept. S—McKeesport, Pa.

Please send us without obligation on our part_____sets of Firthite Field Service Posters which we wish to display in our plant shops.

NAME_____ TITLE_____

COMPANY_____

ADDRESS_____

# The Shapes of Things

NEW APPLIANCES AND DEVICES are taking shape on drawing boards . . . for the competitive sweepstakes ahead. Before you enter yours, it's a good idea to go over your plans again. Check the steel you'll use, for instance, in stamping out fabricated parts . . .

Is it Roebling Strip Steel? Here's one material (now available up to 10" wide) whose performance qualities are familiar, unquestioned. You can predict with confidence how it will speed—without hitch or lag—through your forming, drawing or punching machines.

**HERE'S WHY:** Roebling Strip Steel and Round, Flat or Shaped Wire comes to you precisely as you order it. In size, carbon content and ductility, in steel structure and strength, it's right and ready for the job.

If your wire problems are tough, ask for the experienced advice of a Roebling engineer. A line to our nearest branch office will receive quick attention.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
*Branches and Warehouses in Principal Cities*

ROUND WIRE

FLAT WIRE

SHAPED WIRE

STRIP STEEL

WIRE ROPE

ELECTRICAL WIRES AND CABLES

WIRE ROPE AND STRAND • FITTINGS SLINGS • AERIAL WIRE ROPE SYSTEMS WIRE CLOTH AND NETTING • COLD ROLLED STRIP • ROUND AND SHAPED WIRE • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • SUSPENSION BRIDGES AND CABLES • ELECTRICAL WIRES AND CABLES

**ROE**

**PACEMAKER**

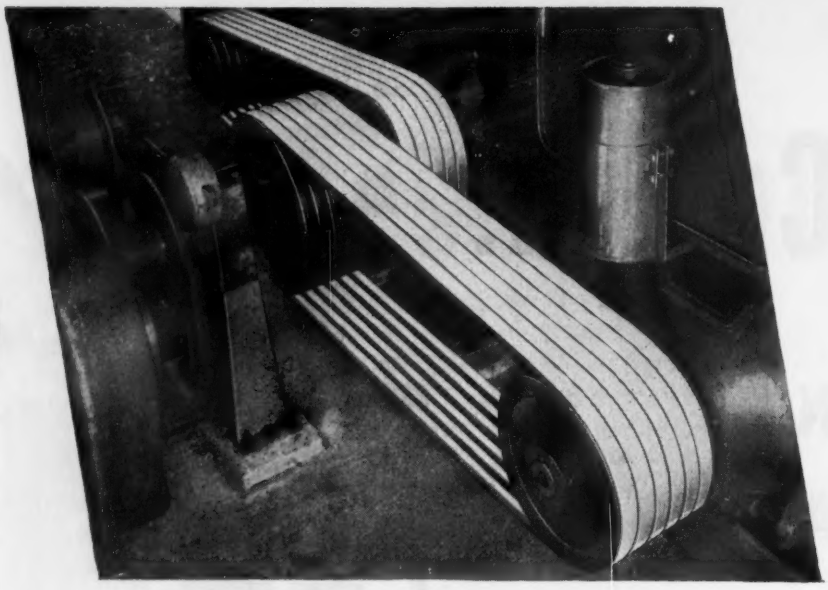
# To Come...

**CAN BE PLANNED NOW... FROM ROEBLING MATERIALS**

WOVEN WIRE FABRICS

# BLING

RIN WIRE PRODUCTS



HERE IS A FACT WORTH KNOWING

# GATES *Standard* VULCO ROPES

## —now made of *Synthetic Rubber* are

## OUTWEARING even *pre-war* belts of *NATURAL RUBBER!*

NO ONE before the war had ever built a V-Belt that could stand the service now daily delivered by Gates V-Belts on army tanks, tractors and self-propelled big guns. Gates developed these greatly superior V-Belts through intensified, specialized research—and Gates is building these belts entirely of synthetic rubber.

✔ **The importance of this fact to industrial V-Belt users is this:**

**Every improvement developed by Gates for these Army V-Belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.**

It is only rarely, of course, that improvements developed primarily for army combat use can be passed on immediately to the general user—but there are very good reasons why Gates has not been called upon to withhold these important V-Belt improvements from Industrial V-Belt users.

Efficient production in our nation's industrial plants is a prime essential to our winning of the war—and better V-Belts than ever before have been urgently needed to keep machines going on the forced-draft, war production schedules that have had to be maintained *24 hours a day!*

That is why Gates has been able to embody in the standard Gates Vulco Rope every V-Belt improvement which Gates specialized research has developed for use on the Army's motorized equipment—and that is why you are finding that your standard Gates synthetic-rubber Vulco Ropes are today giving you better service than any V-Belts that were built before the war.

Gates

THE MARK OF SPECIALIZED RESEARCH

## THE GATES RUBBER COMPANY

***Engineering Offices and Jobber Stocks in All Large Industrial Centers***

457

# GATES VULCO ROPE DRIVES

CHICAGO 6, ILL. 549 West Washington. NEW YORK CITY 3, 215-219 Fourth Avenue ATLANTA 3, GA., 738 C. & S. National Bank Bldg.
LOS ANGELES 21, CAL., 2240 E. Washington Blvd. DENVER 17, COLO., 999 S. Broadway DETROIT 4, MICH., 8663 Grand River Ave.
PORTLAND 9, ORE., 333 N.W. 5th Ave. DALLAS 2, TEXAS, 1710 N. Market St. SAN FRANCISCO 3, CAL. 1090 Bryant St.

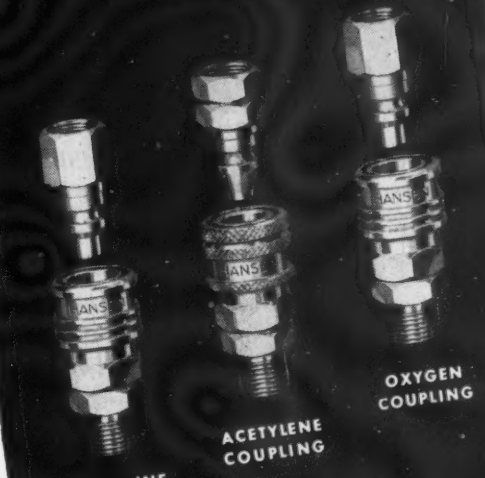
# UP GOES PRODUCTION!
# DOWN GOES COST!

## WITH HANSEN COUPLINGS

● In tomorrow's market, "costs" will be a big factor, not just a talking point, because competition is going to be two-fisted and short-cuts all along the line of manufacturing in the way of savings will be the smart order of the day. Hansen Push-Tite Air Hose Couplings are triple "savers". They save time . . . save effort . . . save air and with all this saving comes far greater production.

Hansen Push-Tite Couplings are fast, simple and easy to operate, slight push of plug into socket, it's connected, locked and air is automatically turned on. Slide sleeve back with thumb, it is disconnected and air is automatically turned off. Hansen Couplings will take pressures from 2 ounces to over 10,000 pounds without leaking. No twisting or turning in order to lock or unlock, full-swivel action prevents kinking of hose. No pins to bend, break or jam, all parts are fully protected.

Hansen Couplings are made for air, oil, grease, gasoline, acetylene, and oxygen. *Send for free industrial catalog covering the complete line of Hansen equipment.*

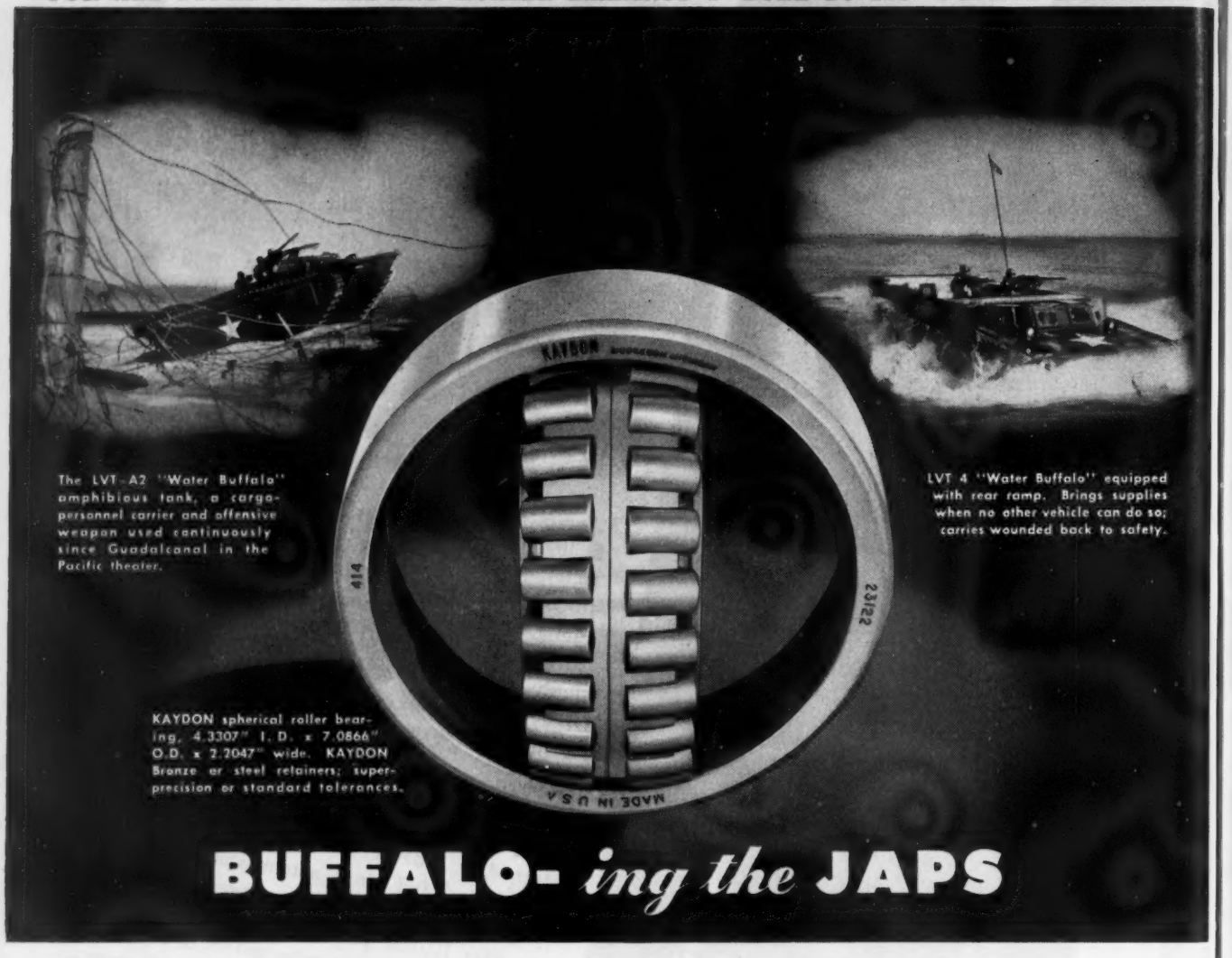



**THE HANSEN MFG. COMPANY**
1786 EAST 27th STREET
CLEVELAND 14, OHIO

*Buy an extra War Bond*
AND KEEP IT !!

*Contact* KAYDON *of Muskegon*

**FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER**




The LVT-A2 "Water Buffalo" amphibious tank, a cargo-personnel carrier and offensive weapon used continuously since Guadalcanal in the Pacific theater.

LVT 4 "Water Buffalo" equipped with rear ramp. Brings supplies when no other vehicle can do so; carries wounded back to safety.

KAYDON spherical roller bearing, 4.3307" I. D. x 7.0866" O.D. x 2.2047" wide. KAYDON Bronze or steel retainers; super-precision or standard tolerances.

# BUFFALO- *ing the* JAPS

**WATER BUFFALOS** . . . by Food Machinery Corporation, Riverside, California

**BEARINGS** . . . by KAYDON of Muskegon, Michigan

**HEROES** . . . by U. S. Army, Navy and Marines

☆ ☆ ☆

KAYDON Bearings serve the machines of the U. S. Armed Forces in many ways, on many fronts. KAYDON is proud of its part in speeding victory.

Specializing in the production of all types and sizes of ball and roller bearings in diameters up to 120", KAYDON offers a service that banishes the need for compromising on a "standard" bearing that does not fill your exact needs.

In addition, KAYDON offers atmospheric control in heat-treating, rarely provided by special bearing manufacturers: flame hardening, precision heat-treating, metallurgical laboratories, microscopy and physical testing.

Capacity available for production of all types and sizes of KAYDON Bearings.

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

# THE KAYDON ENGINEERING CORP.

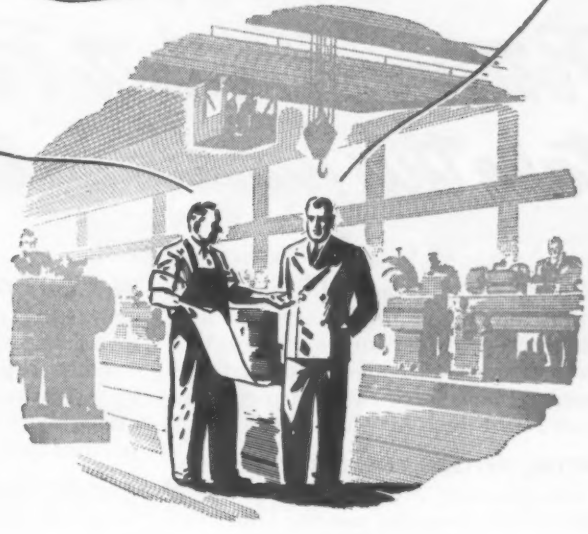
MUSKEGON • MICHIGAN

*New in Name . . . Old in Experience*

# SHORTCUT TO LOWER UNIT COSTS on aluminum parts and assemblies

WE CAN'T MAKE IT WITH OUR MACHINES UNLESS WE GET NEW EQUIPMENT

THEN LET'S SUB-CONTRACT IT TO ORANGE SCREEN. THEY CAN MAKE IT FROM ALUMINUM AND WE'LL SAVE MONEY



That's fine, you say, but who is the Orange Screen Company? How are they better or different than anyone else? Good questions . . . and here's our answer:

We're no "war-baby", nursed on a cost-plus basis, but a hardened 34 year old veteran, wise to the ways of a keenly competitive world. Our specialty is precision aluminum fabrication work and we serve many of America's leading manufacturers in the electronic, aviation and other fields. We're very much interested in continuing to manufacture aluminum products where perfection, lightness, strength and finish are the goal.

If your present or postwar planning calls for any kind of precision aluminum fabrication, and you want maximum freedom in production, write or phone us. Our engineering department will welcome a chance to work on your problem with you.

**ORANGE**
**SCREEN COMPANY**
MAPLEWOOD, N. J.

**OUR FACILITIES INCLUDE:**

Stamping • Spot Welding • Drawing • Induction Brazing
Forming • Machining • Drilling • Line Assembly • Riveting
Spraying • Gas Welding • Baked Enameling • Tools and Dies

**Send today for "Silent Partner" booklet**

This handy pocket-size booklet describes our facilities in detail and explains how we can be your silent partner in solving production problems. Just drop us a line on your company letterhead and we'll send you a copy by return mail.

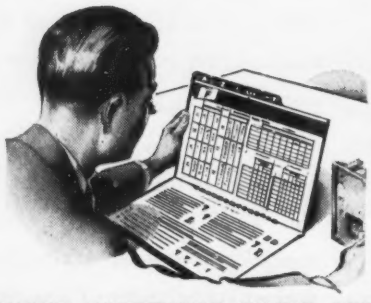
# *Will your Post-war Product Plans take this hurdle in stride?*

**HAVE YOU** given assembly its proper attention in planning your post-war product – or will your time sheets tell you, after you are all set up, that fastening "bugs" are eating up savings you could have been making?

**NOW, BEFORE YOU START** production, question every fastening. Find out where you can use the short cut method – with P-K Self-tapping Screws – before you put up with slower, more complicated methods.

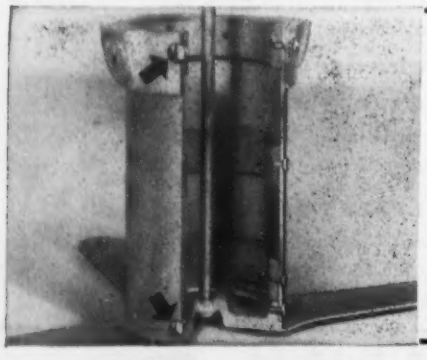
**IN 7 OUT OF 10 CASES** experience proves that with P-K Screws you can save time – speed assembly – cut costs – reduce rejects – improve products – by eliminating needless tapping, awkward bolting, costly inserts in plastics that slow up molding.

**ASK A P-K ASSEMBLY ENGINEER** to help you find all the savings you can make – often from 30% to 50% – or, send assembly details for recommendations.



**HELPFUL FASTENING GUIDE—FREE!**

The 18 tab-indexed pages are crammed full of information on where and how to use P-K Self-tapping Screws, in metals or plastics. File size, fitted with wall-hanger. Write for it. Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.



**FASTER ASSEMBLY OF AIRCRAFT SEATS NO SACRIFICE OF STRENGTH**

"P-K Type 'F' Screws enabled us to make two important assembly short cuts . . . we eliminated tapping, and solved troublesome riveting problems," says Warren McArthur Corp., New York. "P-K Screws give us the rigid unshakable fastening we must have, without the use of lock washers." Sectional view shows some of fastenings to aluminum.

**PARKER-KALON**
*Quality-Controlled*
**SELF-TAPPING SCREWS**

FOR EVERY METAL AND PLASTIC ASSEMBLY

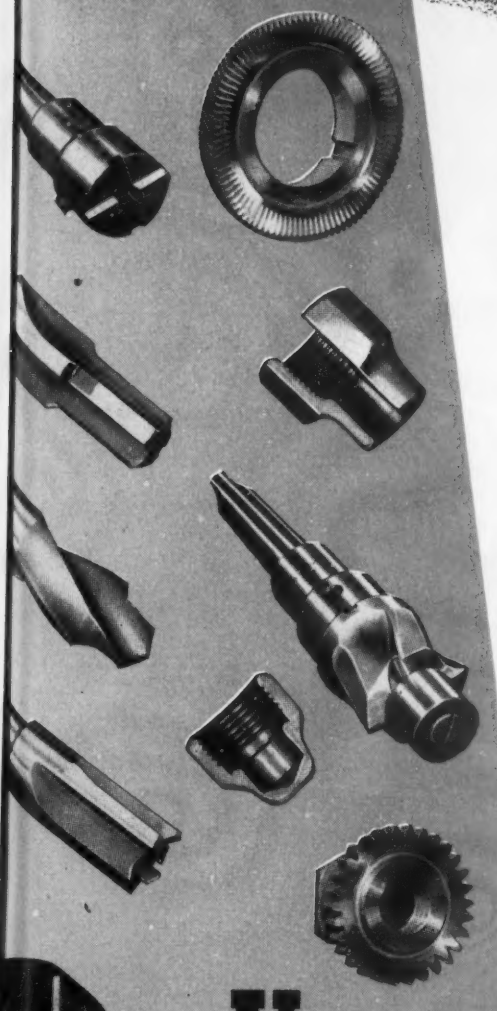
# Sound Advice

FOR YOUR
CUTTING AND FORMING
TOOL REQUIREMENTS

# 6-6-2

MOLYBDENUM 4.50–5.00%
TUNGSTEN 5.50–6.00%
VANADIUM 1.40–1.75%

## An Excellent All-Purpose HIGH SPEED STEEL



★ TOUGH
★ WEAR-RESISTANT
★ READILY FORGED
★ EASILY MACHINED
★ WIDE HARDENING RANGE

A few of its many applications are: taps, chasers, drills, broaches, reamers, hobs, milling cutters, lathe and planer tools

# Vanadium-Alloys STEEL CO.

Latrobe, Pennsylvania

Colonial Steel Division • Anchor Drawn Steel Co.

# 1,000,000 TINY HAMMERS ADD TO LIFE OF SPRINGS!

A MILLION tiny pellets—hurtling with incredible speed and striking from every angle—beat a toughening tattoo upon the Muehlhausen Springs inside this huge shot blaster. This hammering "work hardens" the surface to boost the endurance limit of the spring.

Shot blasting also lengthens spring life by smoothing out microscopic "hills and valleys", and thus prevents early failure from stress concentrations at these points.

The superficial results of this process can be seen with the naked eye—for a clean, lustrous finish is produced. But the more important results show up, only after years of service, in the lasting efficiency of Muehlhausen Springs.

MUEHLHAUSEN SPRING CORPORATION
*Division of Standard Steel Spring Company*
921 Michigan Avenue, Logansport, Indiana

**MUEHLHAUSEN SPRINGS**

EVERY TYPE AND SIZE

***TWO NEW FOLDERS — FREE***

**Die Spring Bulletin illustrates, describes 206 sizes and types of die springs.**

**Armament Bulletin shows importance of springs for many types of war material.**

# New high-solids lacquer . . .

## » LIKE ADDING ANOTHER SHIFT IN THE SPRAY ROOM

*It's just like adding extra operators in the spray room—with high-solids lacquers on the production line. Each coat can do the work of two. Thus operators can turn out more pieces per hour, assembly is speeded up, finished products more rapidly released for shipment. The secret is more solids and less solvent. The high-quality appearance and durability of high-solids lacquers is equivalent to that of older types, in coatings of equal thickness. Use high-solids lacquers for production finishes—and save!*

**ASK YOUR LACQUER SUPPLIER** for details and application data on these new time-and-money-saving lacquers, as they become available. Hercules does not make high-solids lacquers, but concentrates on the production of the highest quality nitrocellulose from which they are made.

CL-55A

HERCULES

Cellulose Products Department

HERCULES POWDER COMPANY

INCORPORATED

930 Market St., Wilmington 99, Del.

## FOR 101 METAL CUTTING JOBS...

*The No. 8 showing new Wells Wet Cutting System — an economical accessory available for all No. 8 Wells Saws.*

# WELLS No. 8 *Time Saver*

With a Wells No. 8 in your shop you save time in these ways: First—there's little set-up time. Your Wells is always ready for any shape, size or type metal you clamp into its quick-acting vise. Then—because the Wells has gravity-feed and an automatic shut-off, one man can operate two or more Wells saws simultaneously. The new Wells-designed Wet Cutting System provides all the time-saving advantages of wet cutting. It's an economical accessory for production sawing. Then too—because a Wells is easily portable, you can save time and labor by moving the saw to the work. Find out for yourself. Write for details.

## *Specifications*

| | |
|---|---|
| CAPACITY: Rectangular | 8" x 16" |
| (Special Guides) | 5" x 24" |
| ROUNDS: | 8" Diameter |
| MOTOR: | ½ H. P., A. C. or D. C. |
| SPEEDS: | Selective 60, 90, 130 feet per minute |
| WEIGHT: | Approximately 750 pounds |

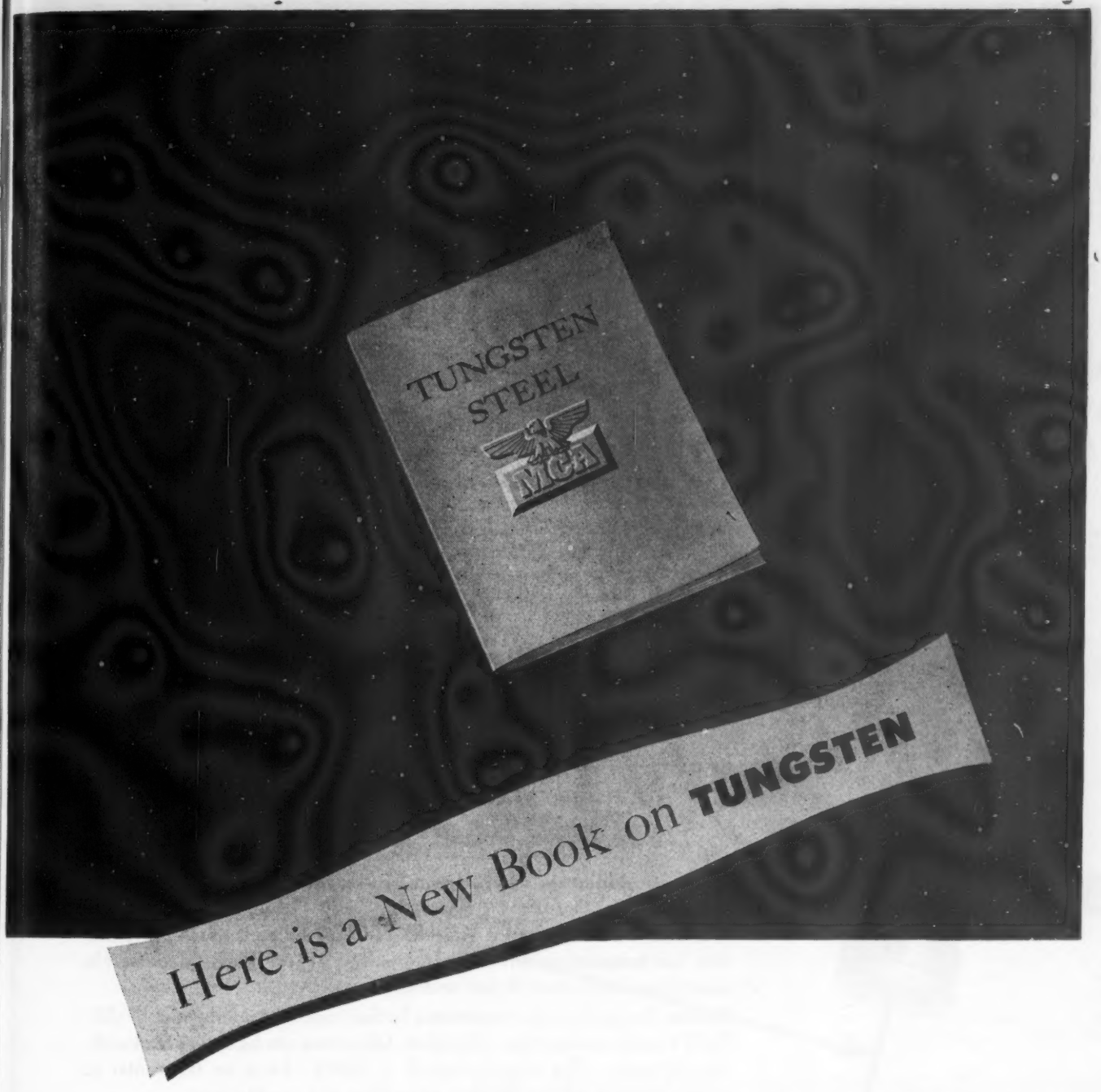
Wells SAWS

Wells

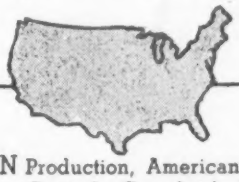
*Products by Wells are Practical*

**METAL CUTTING BAND SAWS**

**WELLS MANUFACTURING CORPORATION**
**1515 FILLMORE ST., THREE RIVERS, MICHIGAN**




The nature and unique values of Tungsten being what they are, and knowledge of the metallurgical uses of Tungsten having recently advanced so much, the largest supplier of Tungsten to the metal-working industry has been prompted to bring out an authoritative treatise on the subject. The book here offered is believed to answer that description. Both scientific and practical considerations are dealt with, and procedures recommended, for best results. A copy of the book will be mailed on request. Correspondence is invited concerning any use of Molybdenum, Tungsten, or Boron.



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Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.
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**MOLYBDENUM CORPORATION OF AMERICA**
**GRANT BUILDING PITTSBURGH, PA.**

MCA

# BRAZING TO ±.0002" TOLERANCE WITH EASY-FLO

This Swivel Joint—a standard part of airplane hydraulic landing gear systems—is another strong argument for EASY-FLO brazed construction—another from the long list of EASY-FLO brazed parts which prove that this low-temperature silver brazing alloy makes strong, dependable assemblies—and does it fast and economically.

But this Swivel Joint demonstrates a further important point about EASY-FLO brazed construction—that close tolerances can be maintained without difficulty. The requirement of ± .0002" limits on the center to center distance of the finished assemblies was readily met.

There are 7 EASY-FLO brazed joints in the assembly—4 tubular and 3 internal. Brazing time on the former is 6 seconds per pair, and on the latter, 5 seconds per joint. This fast production is obtained by following the now widely practiced procedure of preplacing EASY-FLO wire rings at the joints and using a fast heating method—in this case induction heating.

## BULLETIN 12-A TELLS YOU HOW

to quickly put your brazing on the fast, profitable EASY-FLO basis. It gives you complete EASY-FLO details and a lot of useful information about fast production methods, including preplacing the alloy. Write for a copy today.

# HANDY & HARMAN

**82 FULTON ST., NEW YORK 7, N. Y.**

Bridgeport, Conn. • Chicago, Ill. • Los Angeles, Cal. • Providence, R. I. • Toronto, Canada

**Agents in Principal Cities**

# SO ENGINES CAN "BREATHE" IN THIN AIR

● To supply enough air for high powered engines to "breathe" normally in the rarefied atmosphere of high altitudes, these turbo superchargers operate at a speed of about 26,000 r.p.m. At this speed, one ounce inch of unbalance will produce a centrifugal force of 1200 pounds! The need for extremely accurate balance is imperative—to eliminate vibration—to insure the life of supporting bearings—to prevent failure.

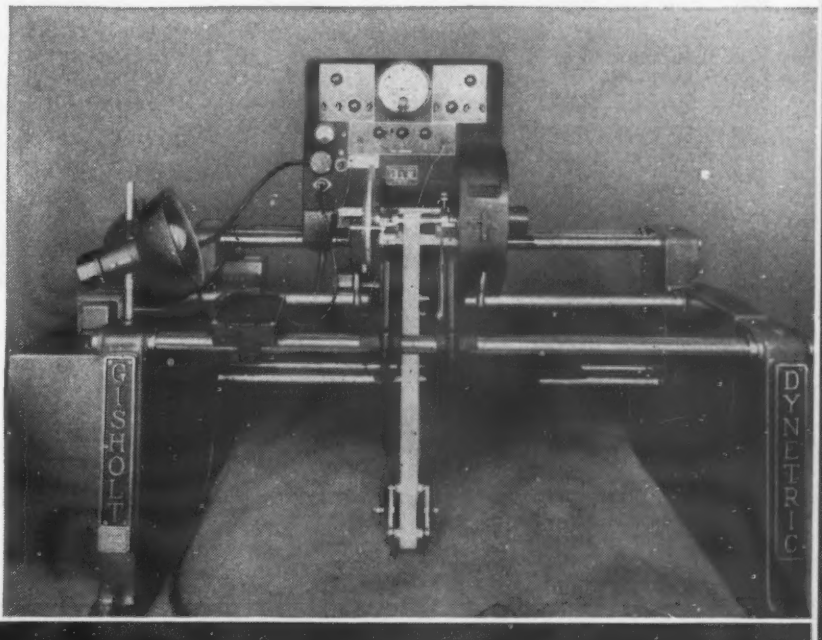
DYNETRIC BALANCING* is the answer to this problem as it is wherever the finest degree of static and dynamic balance is required. Here again, Gisholt Dynetric Balancing Machines *locate* and *measure* unbalanced forces with a degree of speed and accuracy that is not possible by any other means.

Today, the principle used in Gisholt's Dynetric Balancing is applied to practically every kind of rotating part weighing anywhere from ½ ounce up to 50 tons. Complete information is available upon request.

**A development of Westinghouse Research Laboratories.*

*Turbo supercharger assemblies are balanced to an accuracy of 0.1 gr. of weight. To accomplish this, the balancing machine weighs a 1/228,000 part of the total weight of the assembly while it is rotating at 2200 r.p.m.*

**GISHOLT MACHINE COMPANY**
*1217 East Washington Avenue*
*Madison 3, Wisconsin*




*Balancing turbo superchargers on a Gisholt Type 3S Dynetric Balancing Machine. To reduce the horsepower required to drive the assembly, the impeller, or fan, is enclosed in a shroud so that it cannot pump air.*

GISHOLT

*Look Ahead . . .*
*Keep Ahead . . .*
*with Gisholt*

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

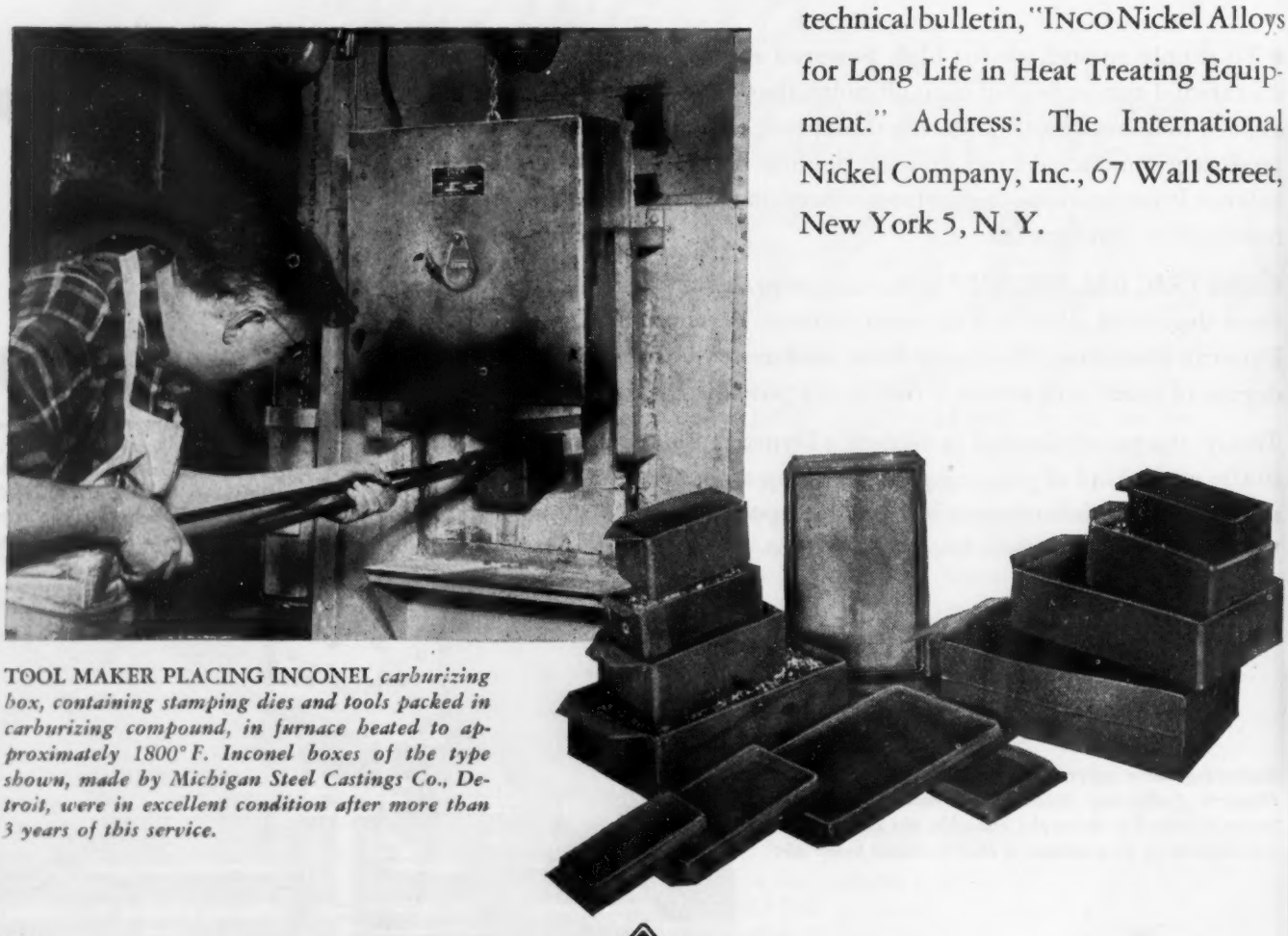
# *In heat treating tools and dies, tool maker reports INCONEL carburizing boxes in excellent condition after 3 years·*

In the plant of the Heyman Mfg. Co., Kenilworth, N. J., boxes made of Inconel sheet by the Michigan Steel Castings Co., Detroit, are used in the heat treating of stamping dies and tools.

In this operation, the boxes are subjected to carburizing at approximately 1800° F. Recent examination showed them to be in excellent condition after more than three years of service.

Inconel . . . the INCO Nickel Alloy especially recommended where strength and resistance to oxidation are required at high temperatures . . . provides trouble-free service in many varied heat treating applications.

For further information, write for the new technical bulletin, "INCO Nickel Alloys for Long Life in Heat Treating Equipment." Address: The International Nickel Company, Inc., 67 Wall Street, New York 5, N. Y.



TOOL MAKER PLACING INCONEL *carburizing box, containing stamping dies and tools packed in carburizing compound, in furnace heated to approximately 1800° F. Inconel boxes of the type shown, made by Michigan Steel Castings Co., Detroit, were in excellent condition after more than 3 years of this service.*

**NICKEL** INCO TRADE MARK **ALLOYS**

**MONEL* • "K" MONEL* • "R" MONEL* • "KR" MONEL* • "S" MONEL* • INCONEL* • "Z" NICKEL* • NICKEL**

***Sheet . . . Strip . . . Rod . . . Tubing . . . Wire . . . Castings . . . Welding Rods (Gas & Electric)***

*Reg. U. S. Pat. Off.

# Fill your tank with S/V Sova-Quench D for•

# UNIFORM QUENCHING RESULTS!

HERE'S THE ANSWER, if you're looking for an extremely stable quenching oil that will give you uniform results over long periods of time.

It's S/V Sova-Quench D, the choice of many manufacturers for efficient, economical quenching.

Designed primarily for stability, this outstanding Socony-Vacuum product resists oxidation and evaporation. It reduces deposits of sludge to a minimum and helps keep your quenching system clean. There is a minimum tendency to smoke and little change in body in extended service.

S/V Sova-Quench D also gives you a somewhat faster "quenching rate" than conventional oils of the same viscosity. Get performance facts and figures from your Socony-Vacuum Representative.

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GARGOYLE Lubricants

Socony-Vacuum's FIVE STEPS to Lower Production Costs for You

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2. Lubrication Schedules and Controls
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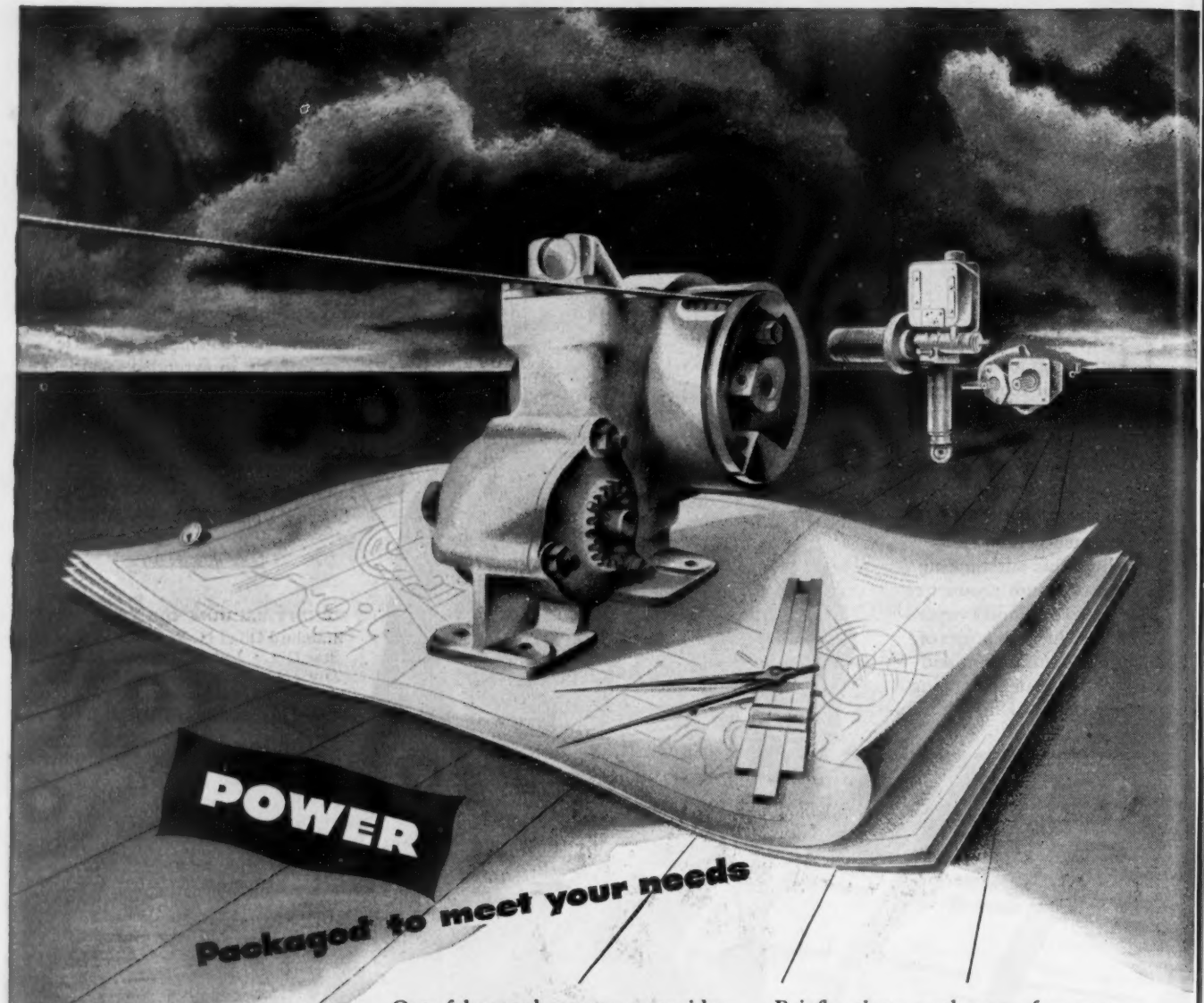



Out of the war has come a new idea in the application of power. In cooperation with aircraft manufacturers, Foote Bros. engineers have developed small power units, compact in size, light in weight, yet exerting tremendous force. These power units are designed for accessory drives and to open and close ventilators, trim stabilizers, operate wing flaps, and perform many other jobs that otherwise would have to be done manually.

Right now in development in the laboratories at Foote Bros. are other applications of these power units—applications on peacetime machines and equipment—that will mean more efficient operation—that will result in definite competitive advantages.

Briefly, these packages of power can actuate linear or rotary motion positively, either by direct or remote control. They may be designed to have an operating force of a few pounds or several tons—they may do one job or simultaneously perform many.

For the machines or equipment you are manufacturing or planning to manufacture, Foote Bros. power units may assure you greater operating efficiency, more compact design, lighter weight, or better engineering. They may simplify your design problems and even make a design practical that without them would be impractical.

Foote Bros. engineers will gladly discuss the application of power units to your equipment.

*A copy of this informative product engineering manual on "A-Q" gears will be sent to you on request.*

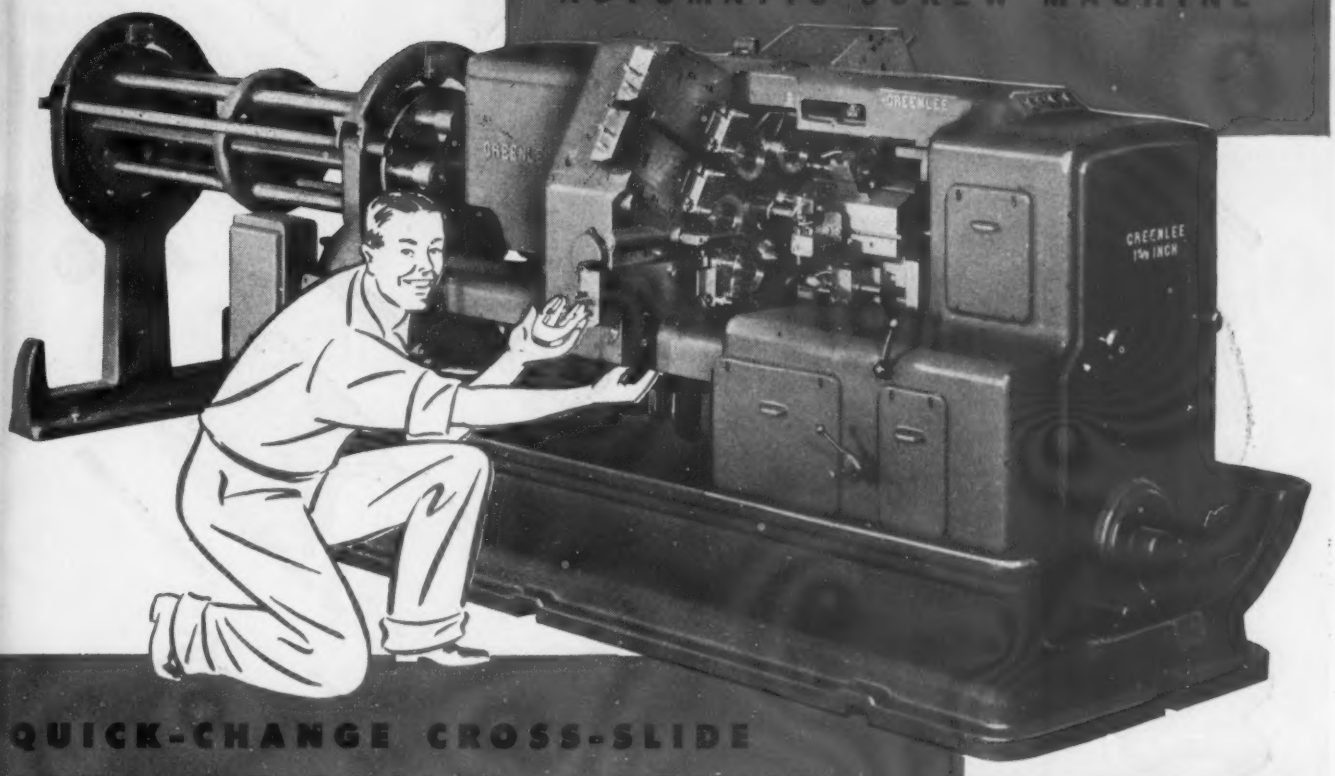
FOOTE BROS. GEAR AND MACHINE CORPORATION, Dept X, 5225 S. Western Blvd., Chicago 9, Ill.

FOOTE BROS.

*Better Power Transmission Through Better Gears*

# SAVE TIME WITH THE GREENLEE "6"

## AUTOMATIC SCREW MACHINE

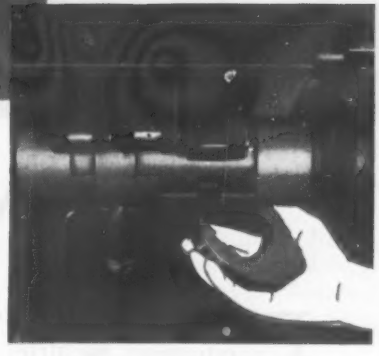



## QUICK-CHANGE CROSS-SLIDE CAMS CUT TOOLING EXPENSE AND SHORTEN SET-UP TIME

**NO SPECIAL CAMMING.** On the GREENLEE "6" it is not necessary to make up or order special cams for the cross-slide feed. Inexpensive, standardized Greenlee cams are made in a range of ratios to meet all requirements and are interchangeable for all cross-slides.

**EASY TO FIGURE.** A quick computation by ordinary arithmetic from the known cuts required, and a reference to a simple table, provide fast selection of desired feed rates and standard cams required for necessary in-feeds. Greenlee cams are specified by a ratio, such as 2:1, 5:1, etc., indicating the ratio of tool slide feed travel to cross-slide feed travel.

**QUICK CHANGE.** To change a Greenlee cross-slide feed cam, you simply knock out a taper pin, slide back the key-carrying collar, pull off the old cam and put the new one in place, slide the collar over, and tap the pin home. In a matter of minutes, all six cams can be changed. The cam shaft is easy to get at, as shown in the pictures above.



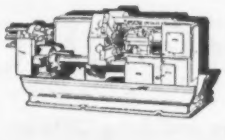
This close-up shows two cross-slide feed cams in place and the third one about to be slipped onto the cam shaft, where it will be secured by the key-carrying collar.

**MANY OTHER FEATURES.** These features of quick change, easy figuring, and standardized cams provide worthwhile savings in machine tooling equipment and set-up time on the GREENLEE "6". In addition, there are many other practical features, because of which this machine has often been called "the Operator's Favorite."

PRODUCTION MACHINERY

**GREENLEE**

**GREENLEE BROS. & CO.**
1927 MASON AVE., ROCKFORD, ILLINOIS



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Standard is prepared to develop and plan for industry, parts of molded rubber, steel stampings, plastics, in almost any shape or form.

The services of The Standard Products Company Research Laboratory and Engineering Departments are at your disposal. Let us have the necessary data and our engineers will submit designs and proposal.

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# *"Find out how* IRIDITE *Balks Corrosion of*

# ✓ Zinc or Cadmium Plate,
# ✓ Zinc Die-Castings,
# ✓ and Galvanized!"

DON'T take our word for it! Mail the coupon below for free test panel and see for yourself how Iridite heads off corrosion on zinc die-cast, zinc or cadmium plated or galvanized surfaces . . . why Iridite is so widely used as a final finish or paint base.

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Iridite goes on with a quick dip of 15 to 60 seconds, is easily dried, is dried even faster with a hot water rinse, permits immediate handling or shipping. What's more, Iridite keeps production moving, maintains automatic machine cycles, needs no special personnel or equipment.

### Used by Leading Companies

Used throughout industry, the Iridite process meets Army-Navy Aeronautical Specification AN-P-32A, Army Ordnance Specification 57-O-2C, Navy Specification OS-1374, and is used by such leading manufacturers as Bulova, Pyrene, Sparton, York, Anaconda and many others.

### Test Iridite Yourself

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### 3 WAYS TO BUILD PROFITS WITH IRIDITE

1 ***As a final finish,*** Iridite is available in a variety of attractive colors.

2 ***As a paint base,*** Iridite holds paint firmly, even on newly galvanized surfaces.

3 ***To reduce costs,*** consider using galvanized, plus Iridite, in place of more expensive metals.

## Mail Coupon for FREE Test Panel!

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Branches—570 Lexington Ave., New York 22; 20 E. Jackson Blvd. Chicago 4; 3411 Sichel St., Los Angeles 31. Distributors in: Waterbury; Grand Rapids; Detroit; Cleveland; Los Angeles; Long Island City; St. Louis.

* Patent applied for

RHEEM RESEARCH PRODUCTS, INC.,
14207 Standard Oil Building
Baltimore 2, Maryland

GENTLEMEN: Please send me a free panel of Iridite-treated zinc plate for laboratory testing and full information and operating details.

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*Company*.....

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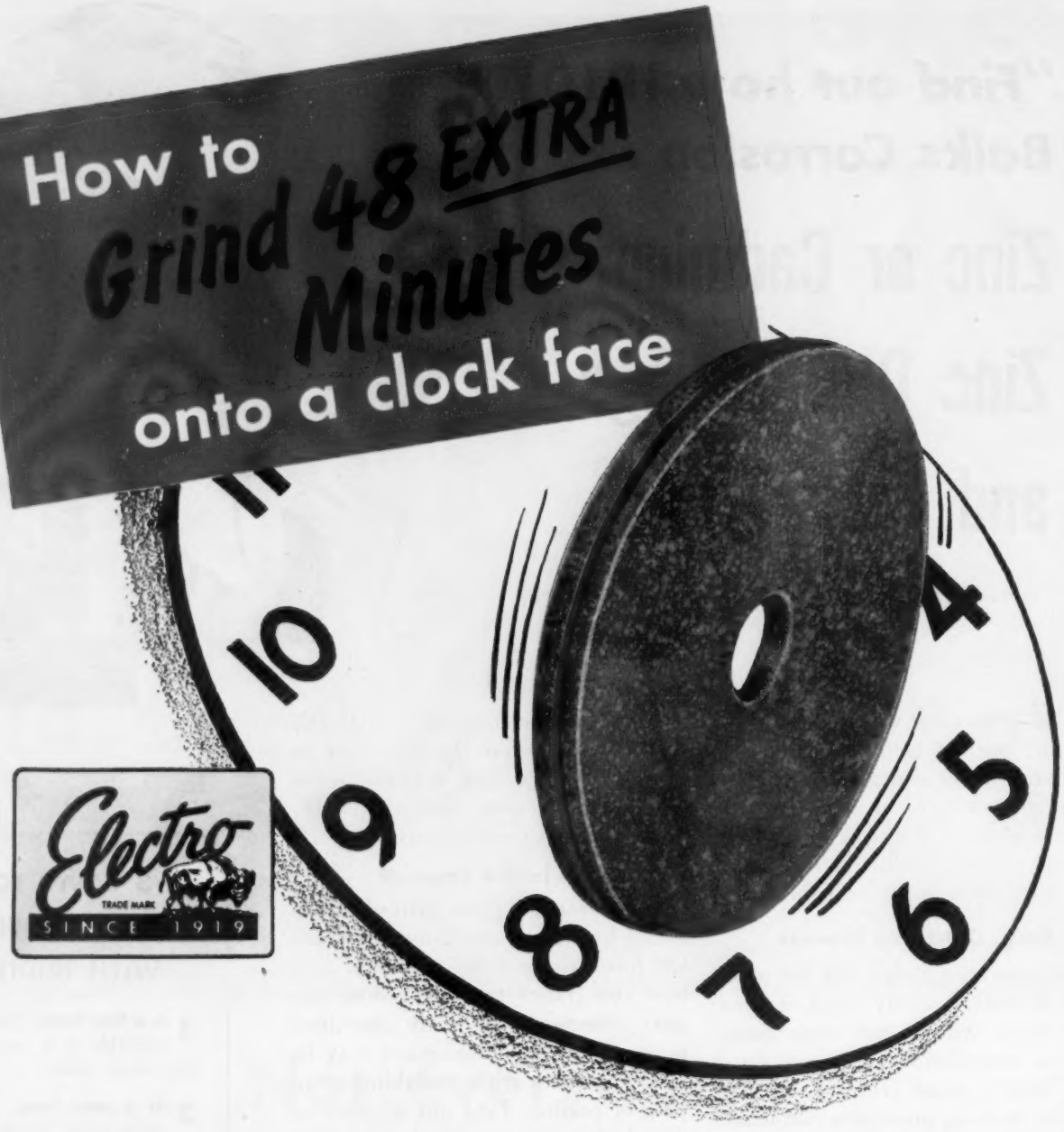
*Keep faith with your fighters and yourself—Buy War Bonds for Keeps*

# How to Grind 48 EXTRA Minutes onto a clock face




**Not once, but three times—if you are on a three-shift basis—and not with the unhappy expedient of overtime, either.**

**ELECTRO Grinding Wheels usually save 10% in cutting time (often more) *because they cut so much faster.***

**Add to this higher cutting speed, their superior cutting ability with less "nursing" and less vibration, uniform and dependable quality and cooler-cutting . . . and you reduce the fatigue factor so that operators can maintain a higher average rate of production right up to the end of their shifts.**

**ELECTRO Grinding Wheels lift employee morale, revive operator's enthusiasm. They do it by working so fast so easy. Their heat resistance and rugged construction, command operators' confidence.**

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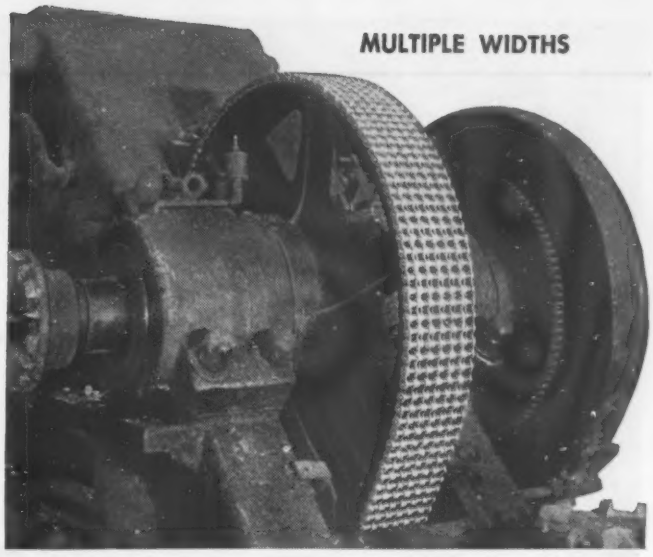
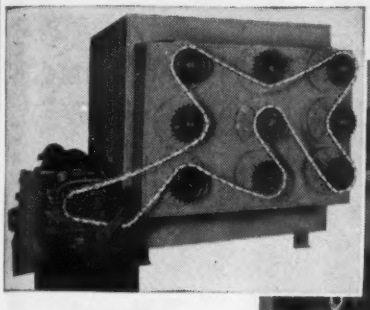
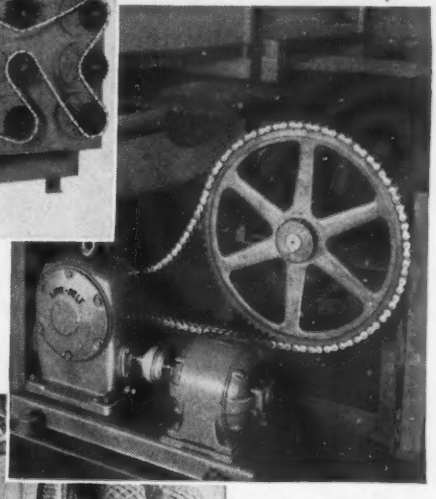


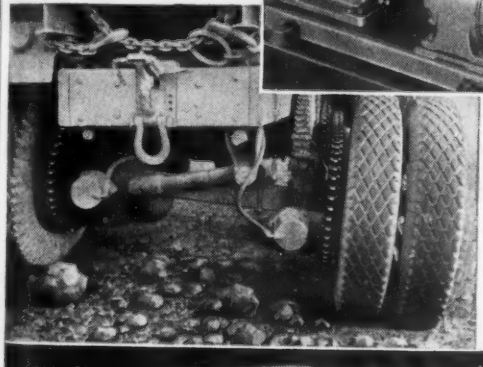
MULTIPLE WIDTHS



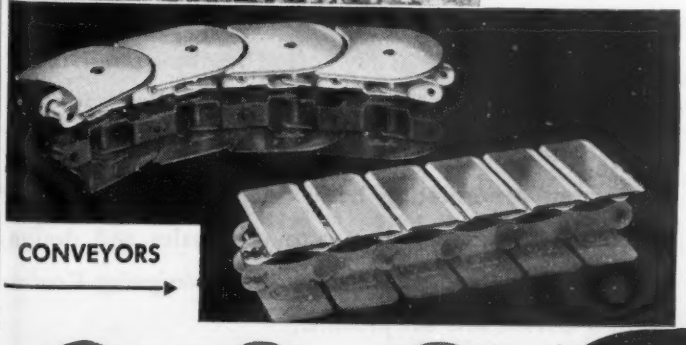
MULTIPLE SHAFTS



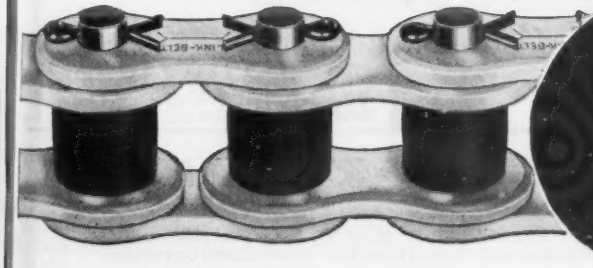
POSITIVE RATIO



TWIST TYPE FOR MOBILE EQUIPMENT



CONVEYORS



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● Designers and manufacturers seeking new versatility and new efficiency in their products rely more and more on the numerous advantages of Silverlink Roller Chain.

Positive transmission of power means perfect timing and coordination of machine operations. Shafts in any number, in any arrangement, can be given either direction of rotation, on long or short centers. While slip or creep is impossible, resilience of chain absorbs heavy shock loads, thereby protecting motor and driven machine.

Depend on Link-Belt Silverlink Roller Chain for efficiency and long service in power transmission and conveying. Write for Engineering Data Book 1957.

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Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in principal cities.

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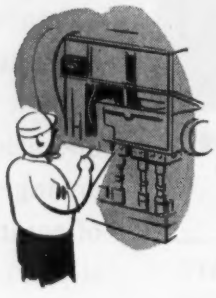
# You can Employ

# Veeder-Root Devices

# as Salesmen . . . as well as

# Production



# "Countrollers"

Veeder-Root Devices can do an outside job of sales-building for you, as well as an inside job of production-building. They can be easily designed and built into your products as an *extra service* that can be effectively merchandised to your prospects and customers . . . in terms of the same advantages you get from the *Count*rolled production machines in your own plant: avoidance of delays, errors, lags, shortages; ability to schedule production more efficiently.

Veeder-Root Devices are compact...have simple drive-connections . . . come in types to fit into the design limitations of your present or postwar products, without necessitating basic design-changes. So why not send this memo *now* to your sales and design engineers: *"Investigate advantages of designing Veeder-Root Devices into our products."*

*The Counting House* of Industry

**VEEDER-ROOT INC.**

**Hartford 2, Connecticut**

*In Canada*: Veeder-Root of Canada, Ltd., Montreal
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Keeping Navy searchlight reflectors spotlessly clean is an unending job. The HAYNES STELLITE alloy, from which many reflectors are made, is so hard that constant cleaning and polishing will not mar its surface.

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UNCLE SAM'S NAVY has the most efficient searchlights on the Seven Seas. They are so powerful that one of them measuring 24 inches across can shoot a beam of light through 23 miles of inky darkness.

The reflectors of these searchlights are made of an alloy perfected and produced by HAYNES STELLITE COMPANY.

The Navy is using HAYNES STELLITE alloy for several reasons. It will not shatter from shock of gunfire. It has high resistance to corrosion by salt air, salt spray, powder and sulfur fumes. It withstands the terrific heat of the arc light—and hot particles of copper and carbon from the electrodes do not cause it to pit and lose its reflectivity. Searchlight reflectors are indicative of the many applications to which HAYNES STELLITE alloys — with their unique combinations of properties — can bring more efficient performance.

•

*HAYNES STELLITE alloys have long been used for scientific mirrors, surgical and dental instruments and other equipment requiring great resistance to corrosion, wear and heat. Unending research is constantly adding to the variety of these alloys. They can be produced in many exacting shapes—in quantity—and delivered ready for assembly without further finishing.*

*A booklet describing the properties of Haynes Stellite alloys is available on request.*

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# HAYNES STELLITE COMPANY

*Unit of Union Carbide and Carbon Corporation*

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ARMY E NAVY

ABRASION- AND CORROSION-RESISTANT ALLOYS

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## Modern Science of Materials Movement to Increase Profits by Reducing Costs

YOUR selling price is the sum of scores of individual costs, plus fair profit. Can those costs be reduced still more—either to improve net earnings or to give customers a *better* price?

Elwell-Parker has answered that question, *with proof,* for Executives in more than 300 branches of peacetime industry. The proof is supplied through *Industrial Logistics*—a phrase coined by Elwell-Parker to describe the science of eliminating waste motions throughout the handling of materials, in Master Unit Loads.

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The Elwell-Parker
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"Industrial Logistics" is a new term, but the economy-principles it incorporates are long-established—applied through the daily operation of thousands of Elwell-Parker Industrial Trucks and Cranes.

Industrial Logistics challenges Management to maintain the maximum flow of peacetime products through every stage of manufacturing, warehousing and distribution to the greatest number of customers, by means of a thoroughly-coordinated Plan. Thus Industrial Logistics is closely related to the placement of returning servicemen; the creation of more jobs; the control of costs and the broadening of markets.

To demonstrate the worth of Industrial Logistics in your business, Elwell-Parker will send an experienced Regional Field Engineer to help you to ferret out wastes in your present load-handling operations —and to show how they can be corrected with Elwell-Parker Truck and Crane Systems, properly installed. Executive inquiries are invited.

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*Established 1893*

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Apex Socket Wrenches are accurately machined from electric furnace high carbon alloy bars – cold broached and carefully heat treated. They are built to withstand tremendous strains and shocks.

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The great new APEX SOCKET WRENCH CATALOG illustrates our entire line of standard wrenches, giving dimensions, prices and everything you want to know. A copy is yours for the asking. Write for it on your company letterhead.

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**THE APEX MACHINE & TOOL COMPANY • DAYTON 2, OHIO**

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**ENGINEERS AND DESIGNERS RECOGNIZE THEM AS A BASIC MATERIAL OF MANY POSTWAR USES IN THE TRANSPORTATION INDUSTRY!**

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WAR production experience has shown that AMP electric-welded tubes are a basic material with many distinctive and unusual advantages. More and more, automotive engineers and designers are using them to develop new products or to improve existing products.

We make electric-resistance welded tubes in outside dimensions up to 5 1/2 inches and with wall thickness up to 5/16-inch. You can forge, upset, swage, expand, form, heat-treat, machine or weld them to your need!

We have the most modern facilities to do all these things for you in production quantities. Use our 28-year experience in this field to save you time, money and improve the performance of your product.

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# *Preformed wire rope*

## MULTIPLIES MANPOWER 3 WAYS

Men who actually work with wire rope prefer preformed. They give many different reasons for this choice, but the net result is more work per line before replacement.

The men say preformed wire rope handles easier. It saves installing time; it's limber—not cranky.

They say it whips less and spools better on drums.

It lasts longer and this means fewer interruptions to production.

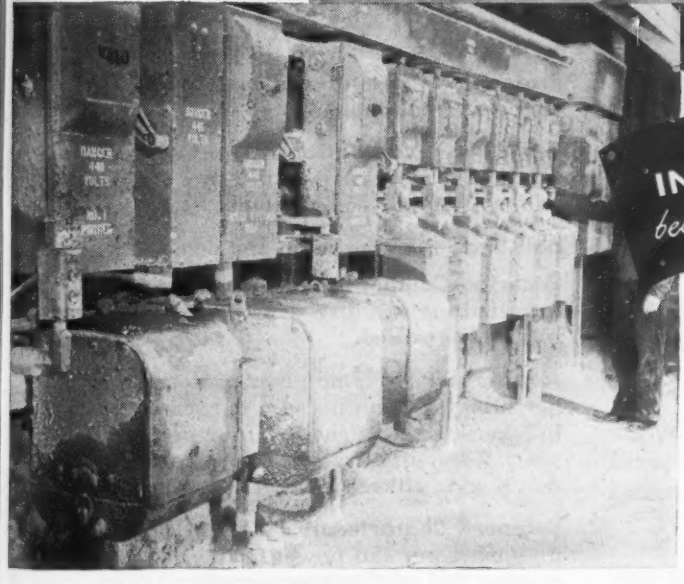
Preformed wire rope costs a little more at first but much less in the long run.

*ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR*

# PERIODIC INSPECTION AND CLEANING ... for cool, efficient operation of breakers and safety switches

**EFFICIENT** *because it's clean!*

Periodic inspection and cleaning keep these Westinghouse circuit breakers and safety switches spic and span —for efficient, *steady* operation... and higher production.



**INEFFICIENT** *because it's dirty!*

These safety switches are badly in need of a thorough house cleaning. Dust accumulations such as this prevent normal heat radiation and raise operating temperatures.

## Westinghouse Recommends These Steps When Inspecting Safety Switches

**1.** Make sure disconnect ahead of switch is open.

**2.** Clean contacts, and check for alignment and proper pressure on hinge and break jaws. Apply light coat of sludge-free lubricant.

**3.** Remove and clean fuse contacts with fine sandpaper; check fuse ratings; tighten fuse contacts.

**4.** Clean switch base and insulating parts.

**5.** Make certain cable connections and lugs are tight.

**6.** Check switch for smooth operation, and clearance of arc extinguisher, safety shields, etc. Lubricate operating mechanism.

**7.** Keep cabinets clean and free from rust—and keep covers closed.

In the urgency of war production, inspection and cleaning of vital control, such as enclosed breakers and safety switches may have been overlooked. Because these are vital links in your plant power distribution system, Westinghouse recommends periodic inspection and "house cleaning".

Benefits are manifold: reduced maintenance, higher operating efficiency and safety standards, protected investment, and not least . . . increased production.

Safety switches and Type AB-I circuit breakers are only two items of the Westinghouse complete line of standardized control. For *any* control, call your Westinghouse office, or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

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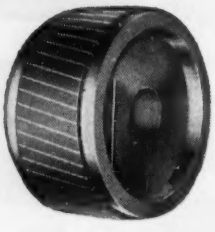
PLANTS IN 25 CITIES... OFFICES EVERYWHERE

**AB-I BREAKERS AND SAFETY SWITCHES**

# The Only Motor with a *Copperspun* ROTOR



Only in Fairbanks-Morse Motors will you find rotors centrifugally cast in *one piece*—and of *copper!*

The characteristics of copper make it the ideal rotor material. Copper has high electrical and thermal conductivity (twice as good as aluminum), greater strength, and low thermal expansion.

The indestructible copperspun rotor, with its better electrical characteristics, puts the new Fairbanks-Morse Motor far ahead of the times in stamina, in protection, and in versatility.

See a demonstration of what this motor can do for you. Write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

## Every Good Feature You Could Ask!

**Protected Frame**—Excludes dripping liquids and falling particles.

**Cross-flow Ventilation**—Another exclusive feature. Air moves in both directions, providing uniform cooling—no hot spots.

**Ball Bearings**—Sealed in and protected.

**Recessed Conduit Box**—An innovation for neat installations in close quarters. Conventional box also provided.

**Adaptability**—Frame gives protection in any mounting position because the vented bearing brackets can be turned to four positions 90° apart. Reversible frame permits locating conduit box on either side.

**Balanced Characteristics**—A 40°C. motor with high efficiency and power factor, and excellent starting and accelerating torques.

*BUY AND KEEP MORE WAR BONDS*

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*A name worth remembering*

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# STEEL

*The Magazine of Metalworking and Metalproducing*

VOL. 117, No. 2 July 9, 1945


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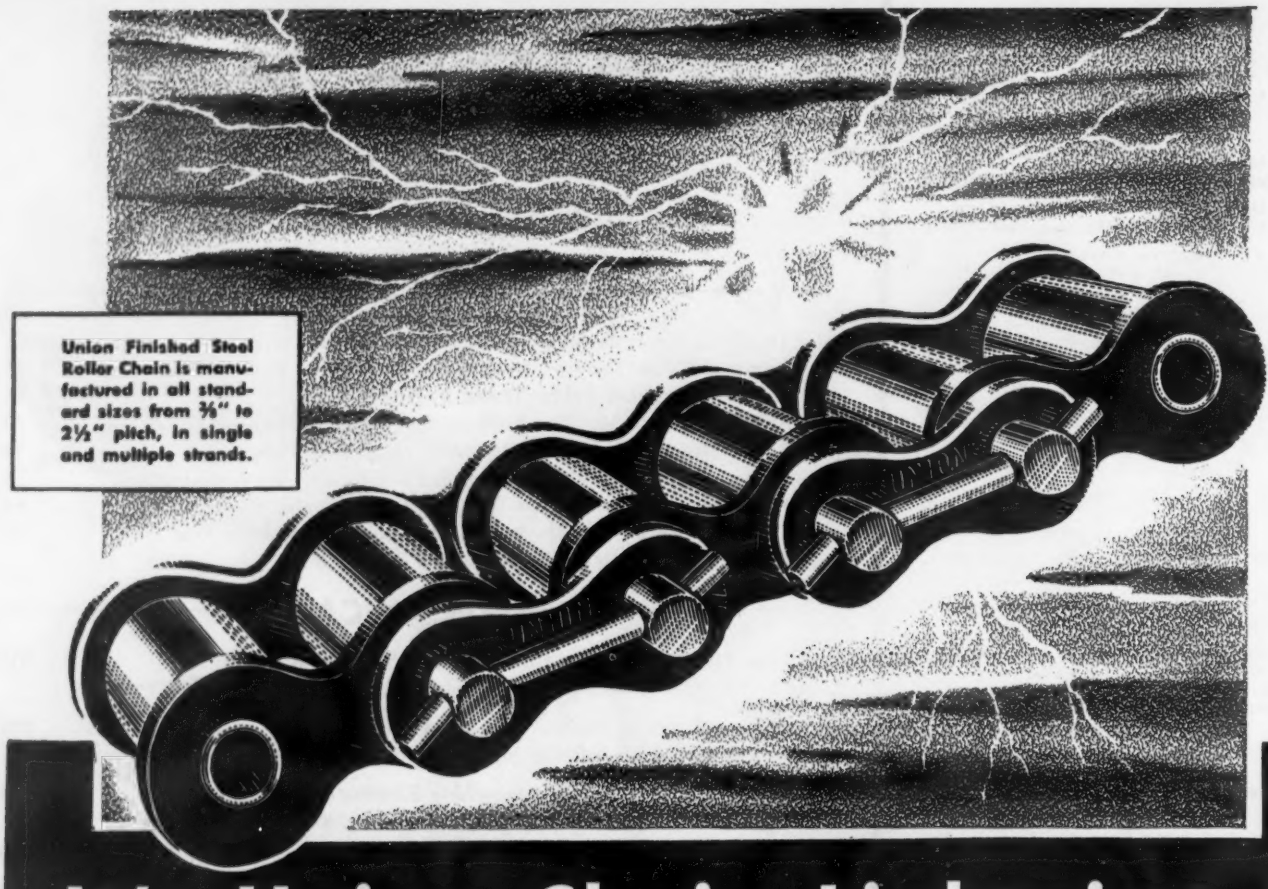

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Flexible Couplings
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- Silent chain type

STEEL
July 9, 1945

# Economic Shackles

It is to be hoped that the midyear report of Fred M. Vinson, director of War Mobilization and Reconversion, does not reflect final Truman economic policy. It leans too heavily upon the efficacy of government planning.

According to the Vinson program, hope for postwar economic well-being rests on three essentials: 1. Increased wages to offset in part the loss of overtime pay and to sustain high mass purchasing power. 2. Stabilized prices—not much above present levels. 3. Revised taxes to encourage business to expand during the postwar period.

To be absolutely fair to Mr. Vinson, one must admit that he places great emphasis upon the importance of private initiative. He says, "After the war, the American economy must be dynamic, with expanding business, expanding markets, expanding employment and opportunity. . . . This expansion must be brought about by positive politics on the part of business, agriculture, labor and local, state and federal governments. . . . Especially important are the plans which individual business men are now making for postwar activities."

This nod to private enterprise, coupled with the recommendation for tax relief for business, would be highly encouraging if it were not for the fact that the Vinson concept of wage and price control may prove to be more destructive than the dependence upon private enterprise and tax assistance prove to be constructive.

The Vinson wage and price program implies regulation. In fact, government fiscal, tax and other policies all are to be keyed to "full employment." This will involve planning to the "n"th degree and, if planning by government for postwar is no better than its planning of the domestic economy for war, it will be a hindrance to "full employment."

One reason why government planning and regulation during the war has not inspired confidence in any quarter is that those who direct wage and price regulations frequently overlook the fact that wages should bear some relation to the value of services rendered and prices should bear a relation to the value of goods produced.

From the Vinson report, it would seem that if the planners feel it is necessary, they will be permitted to rule that employers pay $1.50 for $1.00 worth of work or that producers accept 90 cents for a product that is worth $1.00.

Arbitrary regulation of wages and prices which ignores economic values will not work. Government policy should provide the greatest reasonable freedom for private enterprise to function effectively. That is the only safe formula for postwar economic stability.

---

**TIN PLATE BIGNESS:** Just before retiring from office, Attorney General Francis Biddle issued a report on the disposition of the government-owned steel plant at Geneva, Utah.

The report stresses the importance of decentralizing the American steel industry to curb the dominating influence of eastern producers, states that 20 per cent of tin plate consumption is in the West, reviews the heavy concentration of tin plate production in eight integrated companies and of tin plate consumption in two canmaking companies and recommends a disposal of western government-owned steel plants that will stimulate production of tin plate on an "independent" basis.

One wonders how this can be accomplished. The steel industry has grown up in accordance with federal laws affecting business and in response to certain economic developments which have encouraged bigness for certain products, among them tin plate. If through government manipulation, Gen-

(OVER)

eva goes to an "independent," who is able with or without government help to buck the domination of eastern integrated companies, that "independent" in a few years will find itself in exactly the same position of dominance as the present eastern mills. Also, through the normal play of consolidation and acquisition, the concentration of capacity probably will be no less than it is today.

It will be difficult to cut down economic "bigness." —p. 76

• • •

**ONE AGENCY ENOUGH:** Henry Wallace may soon vie with Maury Maverick as the chief benefactor of small business. To date the latter's Smaller War Plants Corp. has been the most vociferous and most effective champion of businesses of modest size. However, there are signs that Mr. Wallace's Small Business Division of the Department of Commerce aspires to a more prominent role in the affairs of small business.

Wallace appointed a Small Business Advisory Committee. It was an exceptionally good committee and its report, submitted on May 28, is constructive. If the Small Business Division of the Department of Commerce were to adopt the committee's recommendations and were staffed to carry them out intelligently, this division might well become the focal point for aid to small business.

One thing is clear. There is no need for two agencies doing the same work. Cannot SWPC be merged into the Small Business Division? —p. 80

• • •

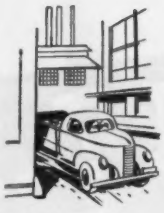
**DANGEROUS REBELLION:** Something is radically wrong when one sees in the current wave of work stoppages so many instances of open rebellion against authority. If this rebellion were solely against WLB, it could be understood. It is the rebellion of strikers against their own union leaders, some of whom are the ablest officials in the labor movement and men of the highest integrity, that should concern the nation now.

These acts of insubordination, attended by a reckless disregard for the sanctity of a union contract, prove that the present laws are inadequate. The situation of widespread lawlessness should cause Messrs. Green, Murray and Lewis to check carefully with their brainiest aids to seek a solution. Perhaps they will discover that the three leaders were hasty and ill-advised in attacking the 2B-1H bill so vehemently. Possibly that bill, offered by temperate, liberal sponsors, would help conscientious labor officials to maintain discipline. Certainly it would be preferable to a law dictated by an irate, fed-up public. —p. 74

**SIGNS OF THE TIMES:** Last Tuesday morning Henry Ford II proudly drove a moonstone gray two-door sedan off the assembly line at the River Rouge plant of Ford Motor Co. This marked the resumption of passenger car production after a suspension which lasted 1241 days or nearly 3½ years. Ford output will be about 400 cars in July (pp. 75, 87) and 4000 next month, with production in later months conforming to government controls which now limit Ford assemblies to under 40,000 in the last half. . . . The Ford resumption was the most spectacular indication that the transition from an all-out war economy, scheduled to begin July 1, actually was under way. Some other civilian hard goods are beginning to trickle from manufacturers' plants (p. 71) but the flow will be restricted for some time by the scarcity of materials and the tightness in manpower. . . . Meanwhile the Army continues to cut back the war production program. Last week the military reduced by $20 million a month the output of medium artillery ammunition (p. 75), this in addition to a 50 per cent cutback in the artillery shell program announced in the previous week. . . . Donald Richberg, one of the authors of the Hatch-Burton-Ball labor bill, challenged labor leader critics of the bill to debate its merits (p. 74) and offered to post a forfeit of $1000 if he does not prove to impartial judges that their attacks have been "unfair, inaccurate and misleading." We would enjoy this debate, if held. . . . Case studies of the effectiveness of X-ray examination of metals in correcting production techniques during the war (p. 102) indicate that this method will be an important factor in "trouble shooting" in the postwar period. . . . D. Roy Shoults, vice president of sales, Bell Aircraft Corp., believes commercial aviation will be advanced tremendously by wartime experience. He foresees 400 to 500 mph for normal commercial flight (p. 94) with radar aids for all-weather operation. . . . Philip S. Shoemaker again cites reasons why it is good policy (p. 78) to acquaint employes with facts about renegotiation and how it affects their interests. . . . Study of the government's authorization for resuming automobile production shows that on the basis of 1941 production, quotas for General Motors, Chrysler and Ford (p. 87) were trimmed to permit larger assignments for Studebaker, Hudson, Packard, Nash, Willys, Graham-Paige and Crosley.

E. L. Shaner

EDITOR-IN-CHIEF



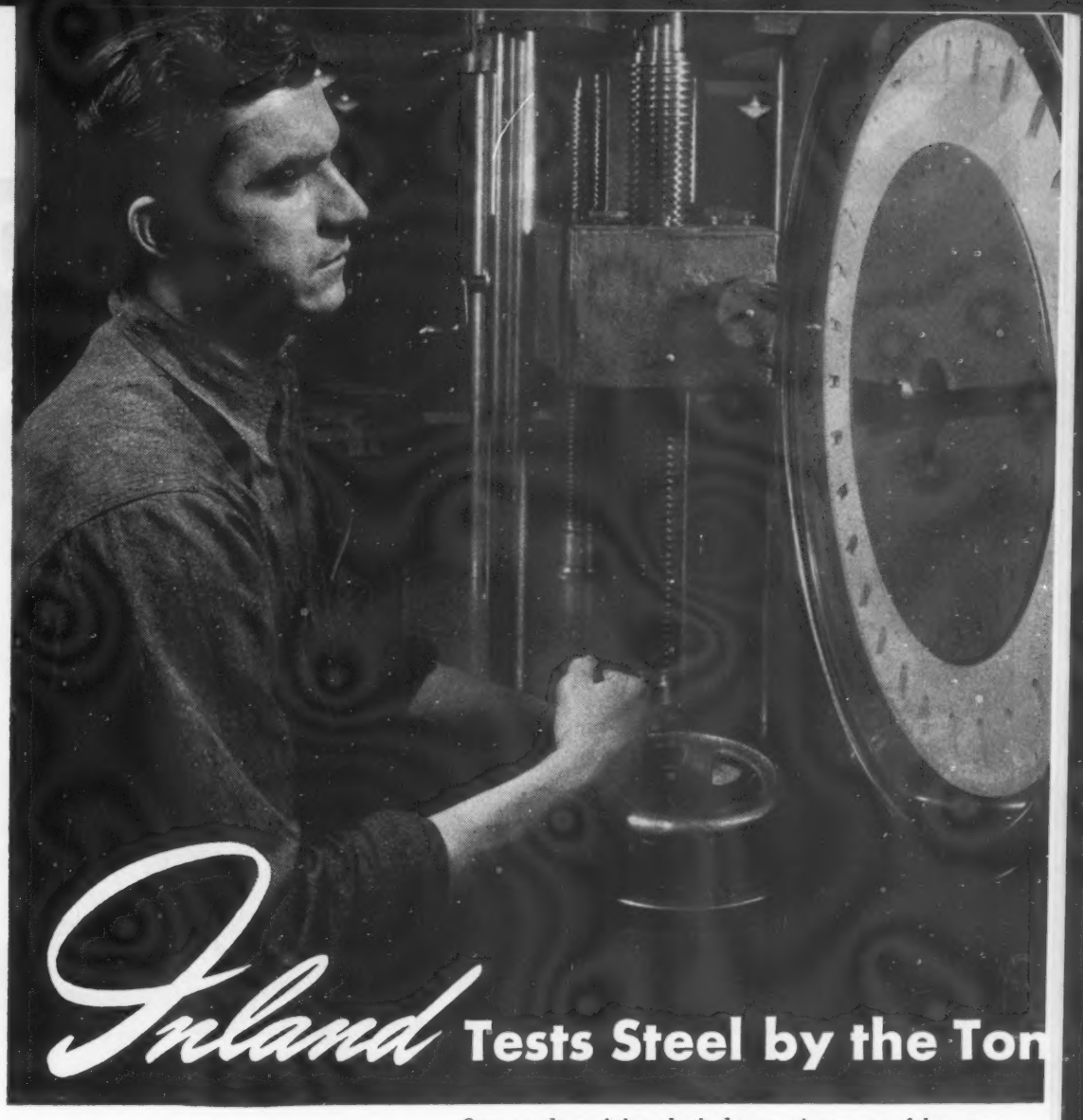
*Special duty trucks gather steel samples for the laboratory.*

*A truck is unloaded at the laboratory, and immediately starts another round trip.*

*Plate samples are punched to rough form, then milled. Others are sawed, turned, drilled etc., as required.*

*Many samples undergo rigid chemical tests.*

*Metallurgical tests are extremely important for quality control.*



# Inland Tests Steel by the Ton

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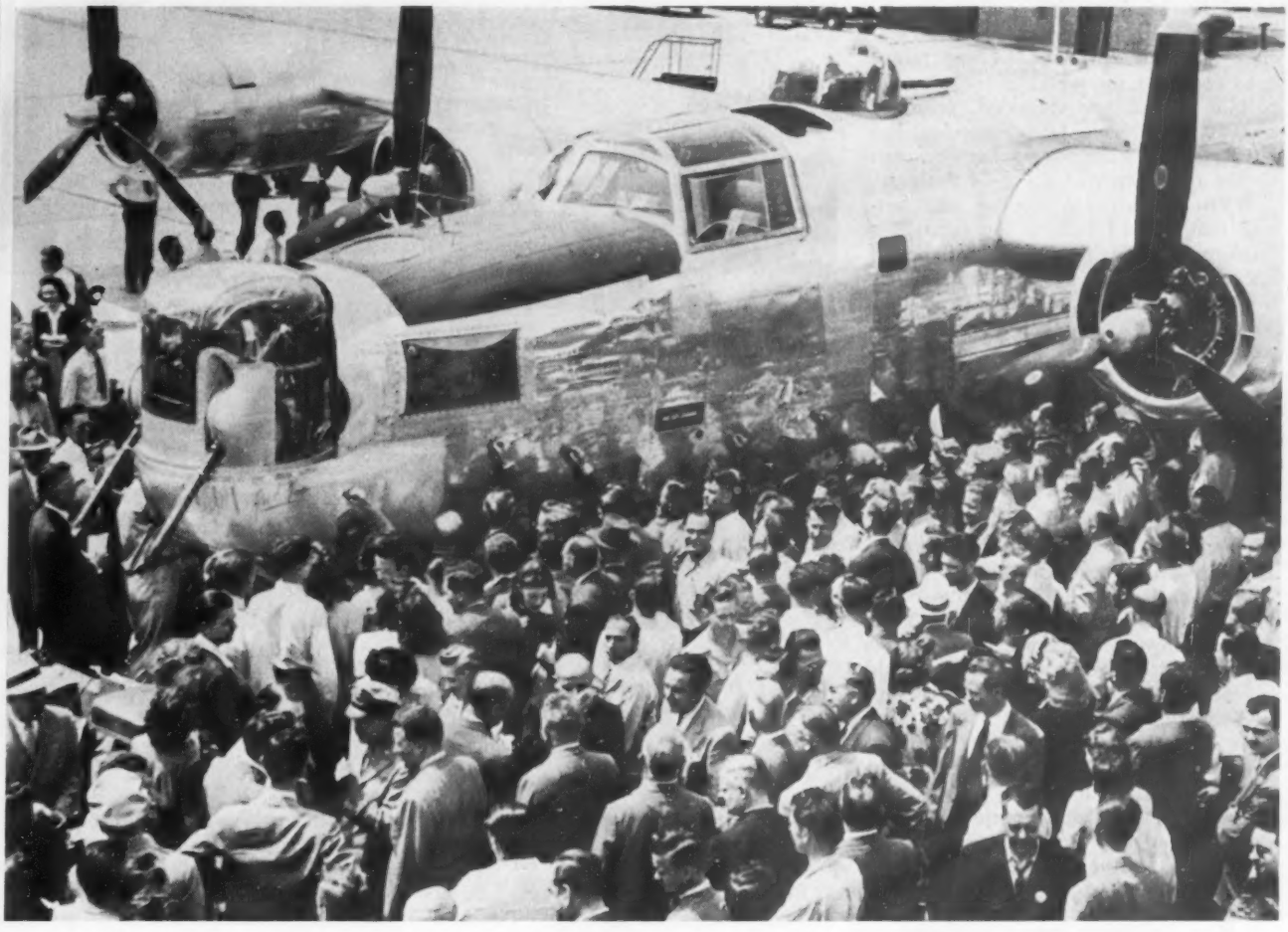


*Hundreds of Willow Run bomber plant employes gather around the last Liberator to come off the Ford assembly line to sign their names on the fuselage. That is the 8685th Liberator the Ford-operated plant has produced in three years*

# Transition Controls Simplified

***Many restrictions lifted as country starts switch from all-out war economy to one permitting substantial manufacture of civilian goods. Shortages of critical material and components will continue principal obstacle***

THIS MONTH officially ushered in the transition period from an all-out war economy to one in which will be permitted as much peacetime goods manufacture as is consistent with prosecution of the war against Japan.

The reconversion process already is well started. First of the postwar automobiles have rolled from the assembly lines. Similarly, other civilian hard goods are beginning to trickle from manufacturers' plants. Munitions cutbacks are releasing an increasing amount of materials, facilities and manpower.

A considerable portion of the strict wartime controls over materials and manpower have been lifted or modified. Local manpower officials now have authority to suspend wartime regulations either in communities or individual plants if they decide such action will not interfere with war production.

A revised and simplified priorities system leading to ultimate discontinuance of priorities control for "virtually everything except military requirements" as soon as war-supporting and essential civilian production no longer need general help has been announced by the War Production Board.

War Production Board orders restricting the production of hard goods are either revoked or subject to the "spot authorization" procedure. Production quota limitations of numerous items have been removed.

Only apparent barriers in the way of a substantial volume of civilian goods output are shortages of materials and components, scarcity of labor in certain areas and of required skills and the unavoidable transitional delays. How formidable these barriers may be cannot yet be judged with accuracy.

WPB estimates third quarter war steel requirements will amount to 15 million tons, compared with 16.1 million tons in each of the first two quarters. Allowing 300,000 tons a quarter as a cushion for losses due to strikes, breakdowns, etc., an indicated 800,000 tons of steel will be available for civilian use.

WPB has ordered a 25 per cent reduction in sheet steel inventories held by war plants, which is expected to make more material available for automobile manufacture. Similar cut was decreed in strip steel stocks to aid manufacturers of household appliances and other items.

However, WPB estimates second quar-

ter CMP steel tonnage carryover to be 1.9 million tons, enough to keep the mills busy for ten days. Prime munitions contracts for which a considerable portion of this was intended, probably 500,000 tons, have been canceled but the steel mills have not yet been notified by the contractors of the cancellations.

WPB officials are hoping and betting that the 15 million ton figure for third quarter war production will be reduced substantially during the period by further cutbacks and that the freed steel will be made available for civilian use. At present, however, they cannot estimate with any certainty the tonnage that will be available.

A suggestion that present controls on components entering into steel production should be maintained until rated orders drop below 85 per cent of productive capacity has been offered to WPB by the Steel Operations and Metallurgical Industry Advisory Committee. The committee listed pig iron, scrap, coke and elements entering into the production of alloy steel among the products on which government restrictions should be maintained until their respective supply situations ease.

In revealing details of the revised and simplified priorities system, WPB Chairman J. A. Krug described the last half of 1945 as a transition period to "give business an opportunity to adjust its operations to the new system" which will go into effect Jan. 1, 1946.

### New Priorities System Outlined

The new priorities system will be introduced gradually during the next six months. This transition period is designed to cushion the impact of the transition from a system under which nearly all production has been regulated to a new system under which military requirements will have top priority but civilian business generally will operate both without production restrictions and without affirmative priorities assistance.

Meanwhile the procedures outlined in the new priorities regulation 29 will be instituted gradually. There also will be changes in other WPB regulations and orders and WPB has cautioned that if there should be any inconsistency between PR 29 and other WPB regulations or orders, PR 29 controls "unless the other expressly states the contrary."

Under the new priorities rating system the present AA rating method and the Controlled Materials Plan will be discontinued at the end of 1945 and replaced by a system in which the AAA rating will still be assigned in emergencies as under existing procedures, but a new MM rating will be assigned by military agencies. WPB itself will assign the MM rating only in cases where it clearly is necessary for the war effort or for requirements of similar urgency.

During the transition period, the MM rating will be equivalent to AA-1. The AA ratings also will be retained for certain materials, if it is not practical to adapt existing controls to the new system.

*Handmade model of the new Mercury, to be produced by Ford within 60 to 90 days, reveals principally a redesigned front end, making extensive use of zinc die castings. First new Fords already are rolling from assembly lines. NEA photo*

Beginning Oct. 1, 1945, no more AA ratings will be assigned by WPB or by other agencies except for deliveries to be made before Jan. 1. Before Oct. 1, WPB will cancel outstanding AA ratings calling for delivery after the end of 1945, whenever this can be done without interfering with war production or war-supporting activities.

Beginning as soon as possible, the military services will assign MM ratings to orders and contracts placed during the transition period for delivery during or after the transition period. They also may change existing orders with AA ratings to MM ratings if necessary to assure delivery on schedule.

At the end of 1945, the Controlled Materials Plan and all its regulations will expire automatically, except that part which restricts inventories. However, the delivery of controlled materials during the third and fourth quarters will continue to be regulated by the plan alone and not by ratings.

Other WPB announcements as the transition period started include:

All alloments of materials for third and subsequent quarters that are identified by the CMP allotment symbols Z-1 and Z-2 have been canceled.

An increase of 126,000 units in the truck production ceiling for the last half of 1945 has been approved.

Manufacture of electric irons has been removed from production control.

Production quota limitations on farm machinery and equivalent and related parts have been removed.

Control over manufacture of cast iron bathtubs and restrictions limiting sales have been removed.

Manufacturers of radio equipment and component parts will be permitted to convert to civilian production under "spot authorization" provided by PR 25, if and when facilities are released by reduced military requirements.

Meanwhile, WPB predicted that munitions production in July will begin to show the effects of cutbacks and the revised schedules set up for the one-front war. May munitions production totaled $4.6 billion, within 1 per cent of schedules, and the June figure will show only a slight drop from May output.

May production was about 7 per cent less than in March. Declines occurred in all major categories except ammunition. Comparative figures for March, April and May:

| | (Millions) | | |
|---|---|---|---|
| | March | April | May |
| Aircraft | $1,234 | $1,155 | $1,129 |
| Ships (incl. maint. and repair) | 831 | 782 | 771 |
| Guns and Fire Control | 269 | 261 | 244 |
| Ammunition | 700 | 692 | 707 |
| Combat and Motor Veh. | 501 | 443 | 441 |
| Communication and Electronic equipment | 338 | 338 | 317 |
| Other equipment | 1,080 | 977 | 978 |
| Total | $4,953 | $4,648 | $4,587 |

The latest munitions schedules call for a total production in the next 12 months just short of $42 billion. By the second quarter of next year, output will be down to an annual rate of $38 billion, more than 35 per cent below the level of March.

# Vinson Calls for Tax Law Modernization; Offers 9-Point Postwar Economic Charter

WARNING that we must have plans for an early defeat of Japan as well as a late one, Fred M. Vinson, director of War Mobilization and Reconversion, has outlined a "postwar economic charter" calling for modernization of tax laws, high wages, full employment and a long-range public works program.

In his quarterly report to the President and Congress, Mr. Vinson said the American people are "in the pleasant predicament of having to learn to live 50 per cent better than they ever have lived before."

To attain the overall objective of a durable peace, Mr. Vinson suggested a five-point plan:

Meet all requirements of the Pacific war.

Reconvert and expand civilian production as fast as possible, both to increase the supply of goods and provide jobs for those released from the armed forces and from war work.

Protect resources as far as possible from the inescapable shock of reconversion.

Provide food and aid that will help the liberated countries to lift themselves to their feet and become self-sustaining.

Work toward a high level economy so America can know the twin peacetime blessings of abundant production and full employment.

### Outlines Economic Charter

His nine-point program for the postwar economic charter, phrased in the generalities of a political platform, included the following:

Complete modernization of the tax laws.

A program to help small business.

A fair, vigorous antimonopoly program.

Measures to reduce industrial strife and encourage higher wages.

Breaking down the barriers to foreign trade.

Expansion of social security.

Measures to improve conditions of the farmer.

A long-term program of public works.

A fiscal policy aimed at maintaining the economy at or near full employment and co-ordinating all government programs that have either an inflationary or deflationary effect.

Mr. Vinson said he regarded overhaul of the tax structure as "the foundation of our entire program to reach and maintain full employment after the war.

"I believe the following principles should guide us in constructing our tax program:

"1. Taxes should be levied in such a way that they have the least harmful effect on the expansion of business investment and the creation of jobs, because productive employment is the source of our standard of living, of all income, and of the revenue which the government collects from taxes.

"2. Taxes should be levied in such a way that will have the least harmful effect on the maintenance of mass markets and mass purchasing power, because that is the basis of business, labor and agricultural prosperity.

"3. Taxes must be fair among people.

"4. Tax policy should be integrated with a fiscal policy designed to prevent inflation and deflation."

## WPB Orders 25 Per Cent Cut in Sheet Inventories

To prevent sheet and strip steel from becoming a bottleneck in reconversion to fabricated products on which production restrictions have been lifted, WPB in the first of a series of moves designed to spread available supply among metal-working industries, has ordered an immediate 25 per cent reduction in permissive inventories. This reduces inventories from 60 to 45 days. WPB in taking other steps to relieve congestion in certain steel products will investigate inventories and purchase order position, notably sheets; will seek more effective use of manufacturers' inventories of idle and excess sheets and strip; increase sheet production with present facilities based on WMC drive for an additional 2000 workers and proposed expenditure of $50 million by private industry for new flat-rolled finishing capacity.

WPB estimates reconversion in the next four months will requre about 350,000 tons of sheets and strip in gages now in short supply. WPB reveals all hot strip mill units have been returned to sheet production except for manpower limitations or to meet plate requirements which cannot be produced on other than strip mill units due to extra deep drawing and pickling. For finishing flat rolled steel WPB reveals a total of 39 projects involving about $34 million have been approved with additional projects costing $21 million under consideration.

# Present, Past and Pending

### ■ KNUDSEN ELECTED DIRECTOR OF GENERAL MOTORS CORP.

DETROIT—Lt. Gen. William S. Knudsen has been elected a director of General Motors Corp. from which he resigned Sept. 3, 1940, to enter government service. Col. Graeme K. Howard has been elected a vice president of the corporation.

### ■ CARNEGIE STRIKE COSTS 15,000-TON OUTPUT LOSS

CHICAGO—About 15,000 tons of steel ingot production was lost at South Works, Carnegie-Illinois Steel Corp., last week when 1200 employes were forced into idleness by a strike of 28 maintenance men.

### ■ WICKWIRE SPENCER APPROVES MERGER PROPOSAL

NEW YORK—Wickwire Spencer Steel Co. has accepted in principle the proposal of Colorado Fuel & Iron Corp., Denver, for merger of the two companies. E. C. Bowers and R. T. Dunlap have been appointed to negotiate a formal merger agreement.

### ■ WILLYS-OVERLAND TO START MAKING CIVILIAN JEEPS

TOLEDO—Willys-Overland Motors Inc. will produce 3000 to 4000 civilian Jeeps a month during the last half of 1945, with volume production scheduled to start in August, according to Charles E. Sorensen, president.

### ■ INVESTMENT FIRMS BUY INTEREST IN EQUIPMENT FIRM

MISHAWAKA, IND.—First York Corp. and Utility Equities Corp., two investment firms, have acquired a substantial interest in American Foundry Equipment Co., this city.

### ■ CONTRACT TERMINATIONS OFFSET BY NEW ORDERS AT GE

SCHENECTADY, N. Y.—Termination of war contracts held by General Electric Co., while proceeding at a substantial rate, has left few gaps in the company's overall business because of the large volume of new orders.

### ■ FEA REFUSES REQUEST TO SHIP RAILS TO SPAIN

NEW YORK—Foreign Economic Administration has rejected a request by private American exporters for authority to ship 100,000 tons of steel rails to Spain.

### ■ OPA MERGES IRON AND STEEL, NONFERROUS BRANCHES

WASHINGTON—Iron and Steel and the Nonferrous Metals price branches, Office of Price Administration, have been merged into a new Metals Price Branch. Warren M. Huff has been named price executive of the new branch.

# Government Labor Policy Tested by Wave of Strikes

*Major changes thought in making as thousands of workers continue idle in some vital war industries. Labor Department strengthening seen in the offing. Proposed Industrial Relations Act gains in favor*

LEWIS B. SCHWELLENBACH

STRIKES involving thousands of workers continued to plague war production on a broad scale last week. Chief trouble appeared to be in the rubber industry, some 37,000 workers being idle in two major disputes at Akron, O., one of which was in its third week. But serious work interruptions were also reported in such vital war industries as glass, petroleum and automotive parts. Strikes last week tied up newspaper deliveries in New York city, and were threatened in a number of other lines, including transportation.

Total number of strikers last week was reported down from the preceding week when an estimated 100,000 workers were idle in walkouts throughout the country. Agreements to end a number of major stoppages in Detroit and elsewhere trimmed the total number of strikers, but new stoppages at other points since, to some extent, have offset the trimming.

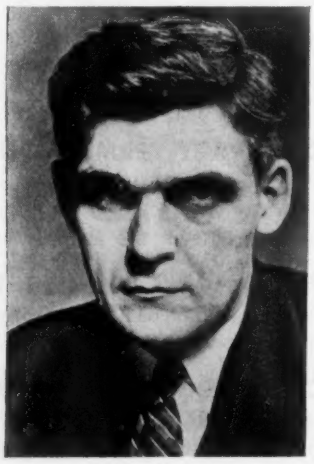
Current unrest in the ranks of labor is believed but the beginning of a period of acute labor trouble. As war orders are cut back on an increasing scale, accompanying shortening in the hours of work, curtailed take-home pay, and displacement of some workers are thought likely to spark the fuze of labor discord on a rising scale. Since V-E Day strikes have more than doubled in number, and government labor authorities are frankly apprehensive that the situation may get worse before it gets better.

Most of the current difficulties, it is believed, stem from the letdown in morale following the victory in Europe. Union rivalries have played an important role in several major walkouts. However, minor grievances have been so prominent as to tag them with the label of excuses for something more deepseated in labor relations. Basically, it is thought, the walkouts are symptomatic of the fear of idleness and shortened take-home pay expected to accompany the trimming of war production schedules.

With public indignation over the interruptions in war production mounting, the nation is looking hopefully to Washington for some move which will clarify the situation and at the same time strengthen the government's position in dealing with labor strife, current and prospective. As a matter of fact, that some major changes in government labor relations policies now are in the making is seen in some quarters, changes which may bear significantly on the whole government program for handling labor matters.

The new secretary of labor, Lewis B. Schwellenbach, has indicated he is planning to revamp his department so as to substantially strengthen it. Not only is he bringing in some new personalities, but he has intimated that he plans to make the department a far greater force in government labor relations than it has

SEN. HAROLD H. BURTON



SEN. JOSEPH H. BALL

SEN. CARL A. HATCH

been in recent years. For example, he has promised to bring into the department numerous government boards and agencies set up during the Roosevelt administration to handle labor questions, and which have been acting independently of the Labor Department. These include the National Labor Relations Board, the War Labor Board, the United States Employment Service, and numerous advisory committees in the War Production Board and the War Manpower Commission. The multiplicity of agencies, which often have been in conflict in their rulings on labor matters, has been a source of interminable confusion in recent years. Elimination of some of these "vagrant" bureaus and the centralizing of authority, it is believed by many experts on labor policy, will go a long way toward creation of sound government labor policies which will function more efficiently in the interest of the public at large.

Meanwhile the Federal Industrial Relations Act, sponsored by Senators Carl A. Hatch (Dem., N. Mex.), Harold H. Burton (Rep., O.), and Joseph H. Ball (Rep., Minn.) continues to gain favor. This bill, vigorously denounced by such labor leaders as William Green, Philip Murray and John L. Lewis, in its principal provisions would bar strikes and make arbitration compulsory in disputes affecting public utilities or public services such as milk, coal or oil; would make the Wagner act ban on unfair practices apply to unions as well as management; and would permit a "closed shop" only if 75 per cent of the workers were members of the union, and 60 per cent of them ratified the "closed shop" demand.

**Challenges Labor Critics**

Last week, Donald Richberg, chairman of the Citizens' Committee to Promote Industrial Peace, which drew up the Hatch-Burton-Ball bill, challenged labor critics of the measure to debate its merits. Mr. Richberg, who has served frequently as counsel for the railway brotherhoods, and was co-author of the Railway Labor Act, the Norris-LaGuardia Act and the National Industrial Recovery Act, all helpful to organized labor in advancing its cause over the past twenty years, offered to post a forfeit of $1000 if he does not prove to impartial judges that the statements from labor union sources concerning the proposed legislation have been unfair, inaccurate and misleading. He said the labor peace plan can harm no one except those labor leaders who can hold their jobs only by maintaining warfare between employers and employes.

Union labor views the proposed Federal Industrial Relations Act as a frontal attack on the Wagner Labor Disputes Act, the "Magna Charta of labor." On the other hand Senator Ball, one of the bill's sponsors, says the program which the new bill incorporates is necessary to avert danger of a knockdown, drag-out fight between management and labor.

# Army Cuts Back Medium Artillery Ammunition Components Program

***Production of storage cases, cartridge cases, containers, fuzes, primers and boosters reduced approximately $20 million monthly. Estimate 7600 workers in 83 plants will be released by September***

ANOTHER major step in adjustment of the nation's war production program, reductions of approximately $20 million a month in the production of medium artillery ammunition components, was announced last week by the Army.

This follows an Army announcement the week preceding that a 50 per cent overall reduction in the nation's artillery shell program was being put into effect.

The cutbacks announced last week after a two-day meeting in Chicago of Army and plant officials include such ammunition components as storage cases, cartridge cases, containers, fuzes, primers, and boosters.

It was estimated that approximately 7600 workers in 83 plants throughout the nation would be released between now and Sept. 1. Manpower was not affected in 118 other plants represented at the meeting. No estimate was given as to the number of workers affected in subcontractors' plants.

The cutbacks were approved by the Production Readjustment Committee of the War Production Board.

It was explained that while production schedules were cut extensively in all cases, only 25 plants received complete cancellations of their contracts. Most plants, although ordered to produce at reduced rates, will retain large potential capacity in case of future emergency needs by the Army.

Following are plants which are expected to release from 100 to 250 workers between now and Sept. 1:

Air Cooled Motors, Syracuse, N. Y., 135; Bridgeport Brass Co., Indianapolis, Ind., 100; Bulova Watch Co., Philadelphia, 136; Chase Brass Co., Waterbury, Conn., 160; Commercial Controls Corp., Rochester, N. Y., 150; Dixie Metal Products, Bessemer, Ala., 206; Franklin Machine & Foundry, Providence, R. I., 170.

General Aircraft Equipment Co., South Norwalk, Conn., 150; General Outdoor Advertising Co., Jacksonville, Fla., 122; Grenada Industries, Grenada, Miss., 110; Harrison Sheet Steel Co., Chicago, 125; Heywood Wakefield Co., Gardner, Mass., 125; Jamestown Steel Partitions, Jamestown, N. Y., 100; Landis Machine Co., St. Louis, 100.

Line Material Co., East Stroudsburg, Pa., 103; Martin & Schwartz, Inc., Salisbury, Md., 119; Mullins Mfg. Co., Warren, O., 100; Multiplex Mfg. Co., Berwick, Pa., 214; National Lead Co., Granite City, Ill., 200; Newark Stove Co., Newark, O., 170; Titan Metal Mfg. Co., Bellefonte, Pa., 100; Tracy Mfg. Co., Pittsburgh, 108.

Following are plants which are expected to release over 250 workers between now and Sept. 1:

Elastic Stop Nut Corp., Lincoln, Neb., 670; Robertshaw Thermostat Co., Youngwood, Pa., 550; Scovill Mfg. Co., Waterbury, Conn., 554; Sunbeam Electric Co., Evansville, Ind., 300; Supreme Knitting Machine Co., Brooklyn, N. Y., 295.

## First 1946 Fords Driven Off Rouge Assembly Line

After 1241 days or nearly 3½ years of suspended passenger car production, the first assemblies of 1946 Fords were driven off the Rouge plant assembly line on schedule last Tuesday morning, the first model being a moonstone gray two-door sedan, with Henry Ford II at the wheel as lights blazed, cameras clicked and newsreels ground out the event.

Stretched out behind No. 1 along the assembly line in B building were a score or more of other cars in various stages of assembly. Efforts are being made to turn out 15 to 20 cars per day this month, and to step up schedules to better than 4000 next month. Eventually, the younger Mr. Ford told newsmen, the company hopes to push production to 8000 per day. However, the Ford quota for this year is under 40,000, and if this is not increased it is felt likely over 50,000 more working people will have to be laid off at the plant.

That Ford was able to get production initiated so soon is a tribute to the engineering and mechanical staffs of the company. In the press shop alone, now 90 per cent reconverted, more than 3,000,000 tons of heavy machinery, dies and other equipment had to be brought in, removed or relocated.

First passenger car production from the Ford plant will be rushed out to dealers, probably on consignment, but no sales will be possible until prices are determined.

First hand-made models of the Mercury and Lincoln passenger cars also were shown last week and reveal principally redesigned front ends, making extensive use of die castings.

Four new assembly plants will be built throughout the country for Ford.

# Biddle Recommends Independent Operation of Geneva Steel Plant

***Tin plate seen as key to future of western steel industry. Retiring attorney general believes war-born facilities can be converted to supply half of West's requirements for containers. Hits dominating influence of eastern mills***

DECENTRALIZATION of the country's steel industry to end the dominating influence of large eastern producers and the encouragement of independent, competitive operation of the West's war expanded steel capacity was recommended by retiring Attorney General Francis Biddle in a report to Congress on the disposal of surplus steel plants. The report, Mr. Biddle's fourth on the disposition of surplus property, was his swan song; after submitting the report, he relinquished the Department of Justice to Tom C. Clark, President Truman's appointee.

The report holds that the future of large-scale steel production in the western states is dependent principally upon an orderly conversion which would supply one-half the West's demand for tin plate containers. It notes that the inevitable drop in ship production on the West Coast will create a reconversion problem unequalled in the country and adds that "successful continuous steelmaking operations in the West afford the soundest basis for future industrial expansion in that area."

Mr. Biddle's survey shows that 20 per cent of all United States tin plate consumption is in the West, although before the war almost all this market was supplied by the East. It indicates a postwar western tin plate market sufficient to provide a basis for large-scale operations, providing certain requirements are met. He lists these as the most important requirements: "First, that the western steel industry be free from monopolistic control so that it can adopt pricing policies which will permit it to compete aggressively with the eastern mills. Up to the present time, tin plate has not been sold on a competitive basis in the West. A concentration of producers and consumers has resulted in high and rigid prices. The future owners of the newly developed western steel plants should have the opportunity to enter into this market on a competitive basis.

"Second, it is of the utmost importance that the future railway rates reflect the competitive advantages of location and bear logical relationship to transportation costs on raw materials and semifinished products within or into the region.

"These factors are of the utmost importance for the future of the government-owned steel plant at Geneva, Utah. The future disposition of this plant with its 1,280,000 tons of ingots is crucial to the reconversion program in the West. The policies and purposes of those who buy this government plant may well be the determining factor in the future of the western steel industry. Everything possible should be done to assist potential purchasers of the Geneva steel plant to draw plans for its operation.

### Favorable Operating Costs Seen

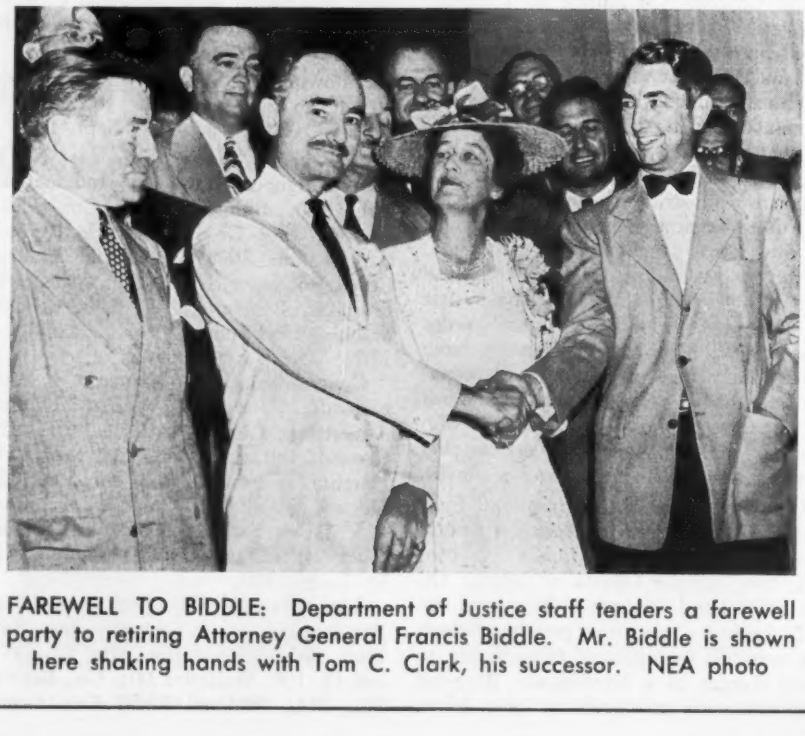
"The conclusion that the western tin plate industry will provide the basis for the continuation of large scale continuous steel production in the West is, of course, dependent upon certain findings as to relative operating costs. All the information now available appears to point toward favorable operating costs for western tin plate production. But potential purchasers of the Geneva Steel plant should have made available to them an adequate appraisal of its operating costs. A cost study of the Geneva Steel plant has been undertaken for the Defense Plant Corp. It is recommended that the results of this study be made available on a widespread basis, and that in the meantime as much interim information on the results of the study as possible be given to potential purchasers."

The report points out that tin plate is today almost exclusively produced by large integrated steelmaking companies whose operations extend from ore mining to the manufacture of pig iron, ingots and the rolling of wide variety of steel products, in addition to the coating of the finished steel with tin to make the finished product tin plates. Independent nonintegrated producers of tin plate have virtually been eliminated from the tin plate business.

As early as 1938, 84 per cent of the tin plate producing capacity in the United States was in the hands of eight integrated steel producing companies and of this number three concerns controlled about 60 per cent of the capacity. The analysis shows that with the advent of the newer methods of producing tin plate the degree of concentration in the industry has increased. It is estimated that 95 per cent of the current capacity is controlled by the eight integrated companies, of which four companies now control approximately 75 per cent of the capacity.

Practically all of the tin plate produced is used in the manufacture of containers.

"The container industry is also characterized by a high degree of concentration of control," the report notes. The American Can Co. and the Continental Can Co. have approximately 85 per cent of all can sales and control almost the same percentage of the purchases of tin plate from the steel companies. In the western area, approximately 90 per cent of the purchases of tin plate is



**FAREWELL TO BIDDLE:** Department of Justice staff tenders a farewell party to retiring Attorney General Francis Biddle. Mr. Biddle is shown here shaking hands with Tom C. Clark, his successor. NEA photo

estimated to be controlled by three principal producers of containers.

"Historically, tin plate prices have been determined principally by negotiation by the American Can Co., the principal buyer, and the United States Steel Corp., the principal seller. Both the purchasing of tin plate and the selling of cans is normally done under long-term contracts from three to five years' duration, and the price of cans is controlled by the price of tin plate through these contracts. The fact that both the selling and buying of tin plate has been highly concentrated has made for these effective contract control arrangements and has served to eliminate price competition. The elimination of price competition in addition has been furthered by the common use of a basing point system in the sale of tin plate. This basing point system has made for artificially high prices on the West Coast."

It is estimated that a potential market amounting to approximately 500,000 tons per year will exist in the West for the consumption of tin plate. It is concluded that western steel mills should be able to sell about half of this amount. This conclusion is based upon such relative cost figures as have been obtainable, upon the assumption that competitive freight rates will be established, and that there will be effective competitive pricing in the West. It is believed that in the postwar market eastern tin plate shipped from plants having all-water access to western markets, principally Birmingham and Sparrows Point, Md., can provide effective competition for western mills and at the same time opportunity will be afforded for the maintenance and growth of a healthy western steel industry.

### Urges Competitive Operation

Throughout the report, Mr. Biddle argues for competitive and independent operation of the Geneva Steel plant. He contends that capture of substantial tin plate business is vital to successful operation of integrated continuous rolling facilities in the West, inasmuch as normally more than 40 per cent of the demand for flat-rolled steel in the area is for tin plate.

"It is clear that the prospective tin plate market is vital to the disposition of the government-owned Geneva plant at which continuous rolling is technologically logical. The success of continuous operation in the West will stand or fall on tin plate business. On the other hand, if substantial tin plate business is developed by Geneva, successful operation of that plant can be conservatively forecast."

The report includes a table on possible distribution of western steel sales required for the operation of Geneva, which indicates that if the plant obtains 20 per cent of the amount of the steel business done in the West in 1937, operations at two-thirds of capacity can be achieved.

| | Thousands of Net Tons | Per Cent of Western Consumption 1937 |
|---|---|---|
| Ingot capacity | 1,280.0 | |
| Equivalent finished product | 896.0 | |
| Flat-rolled products | (405.0) | 37 |
| Plates | 50.0* | 23 |
| Skelp | ..... | .. |
| H. R. sheets, strip | 90.0 | 41 |
| C. R. sheets, strip | 10.0[1] | 35 |
| Galvanized sheets | 55.0[1] | 36 |
| Tin plate | 200.0[1] | 43 |
| Other rolled products | (192.3) | |
| Rails (over 60 lbs.) | ..... | .. |
| Heavy shapes | 40.0 | 24 |
| Wire rods, bars | 60.0 | 16 |
| Pipe, tubes | 92.3*[1] | 19 |
| Plain wire | ..... | .. |
| Other | .....* | .. |
| Exports | .....* | .. |
| Tonnage required for utilizing 66 2/3 per cent of equivalent product capacity | 597.3 | 21 |

* Most favorable prospects for substantial increase.

[1]Production of these products requires additional rolling facilities.

Mr. Biddle contends fuller distribution knowledge and more positive salesmanship of the Geneva property is required to achieve the desired result of stimulating the western industry.

"Practically no stimulation of demand among possible buyers has been attempted. There is a disposition to wait and see what is offered. In the meantime, Geneva may be declared surplus.

"Independent competitive operation is essential. Principal competition can be expected from eastern producers (principal western interests have complementary facilities). Disposal to eastern steel interests, especially those with water access to western ports, would substantially lessen competition and could retard development of western facilities. . .

"The government should be prepared to finance the additional rolling facilities required, construction to be begun as soon as possible.

"Disposal by sale to the highest bidder will too severely limit possible purchasers. Careful provision must be made against acquisition of the plant by those having other interests which would be protected by limited operation at Geneva. If satisfactory independent purchasers cannot be found, every effort should be made to secure independent, competitive operation under lease, purchase price to be determined on the basis of actual operating experience over a reasonable period."

Mr. Biddle summarizes the report in 15 conclusions, as follows:

1. Basic steelmaking capacity has been more than doubled in the West since 1938. Most of this increase is accounted for by two new integrated companies—Geneva and Fontana.

2. Prior to the war there were no integrated large-scale steelmaking plants in the West except for the Colorado Fuel & Iron Corp. works, east of the Rocky Mountains at Minnequa, Colo. The principal products produced in the West prior to the war were rails, bars, shapes and wire products. In most of these categories western capacity was sufficient for western demand in those sizes for which rolling facilities were available, but for other principal items of steel consumption there was almost complete dependence upon eastern production. Two of the most important of these categories were tubular products and tin plate. (1937 consumption of these items in 11 western states was approximately 480,000 and 450,000 tons respectively.)

3. The great increase in steel productive capacity in the West during war years was occasioned largely by the requirements of the western shipbuilding program. In 1938 western plate capacity was approximately 25,000 tons; in 1944 it was 1,025,000 tons.

4. Most of the increase in plate capacity is at he government-owned plant at Geneva, Utah, and the government financed plant of the Kaiser Co. at Fontana, Calif. At Geneva, the larger plant (ingot capacity 1,280,000 tons), plates are produced by continuous operation, so that with the addition of two more stands of rolls, light flat-rolled products by continuous methods would require what in effect would be duplication of much of the present plate rolling facilities.

5. Postwar requirements in the West, even under the most optimistic estimates, could sustain only a small fraction of present western plate making capacity, so that conversion to other products is required for continued operation of the new plants.

6. Continuous production of steel products in the West affords the most promising possibility for utilizing the large investment at Geneva, but such operation must be able to envisage a substantial market for light flat-rolled products (sheets, strip and tin plate).

7. Participation in western tin plate requirements is the key to successful continuous operation in the West. Demand for this product is substantial and has been increasing each year.

8. The relative cost data available, including assembled raw materials and probable transportation costs to principal markets, are favorable, even in comparison to eastern seaboard producers.

9. Early determination of reasonable commercial rates on western rail movement of steel is essential.

10. Market participation will not, however, be achieved without aggressive independent pricing. The tin plate market is concentrated both with respect to production and consumption. Successful operation of Geneva, therefore, requires western tin plate prices which are unattractive to inland, eastern producers.

(*Please turn to Page* 196)

# Renegotiation Shoe Pinches Man In Shop as Well as Management

*Employment possibilities and payrolls in postwar period hinge on industry's ability to set aside reserves to carry on in lean years. Workers should be informed as to what renegotiation is and how it works*

By PHILIP S. SHOEMAKER*

THREE men in one shop died of pneumonia in a month. Few people paid attention. War strain and the change from outdoor living to confining shop work had drained the last of their reserve strength. These men had been overseas in combat units, but they were not counted among the war casualties, for it was now 1920. "No help wanted" signs were appearing on the gates. The war and all the cheering and parades had ended. Only small boys still talked about the war. But the big battle for a living was on!

There were small and large plants that failed that year. Inventory losses totaling billions wiped out reserves that had been accumulated during the war. Millions of workers walked the streets looking for jobs. This was the industry's first postwar shock.

### Cites Industry's 1920 Experience

There was a certain small manufacturing plant in an Ohio city which barely survived. Without fanfare after the armistice the veterans who had been employed previous to their service were invited to come back. Likewise the loyal older men who had worked throughout the war were retained, if they needed work. It was a ticklish situation, for there was no backlog of orders. When the genial president of this small corporation was asked "how come" by his banker, he replied that he was building up his "stock." Two lean years later saw all the accumulated profits of the war paid out in payrolls. Deflation had reduced market prices 40 per cent so when an order came in each machine went out at a sizable loss. By 1921 it was necessary to borrow to continue operating. Only guts and a friendly banker pulled that concern through.

It took 19 years for the company to get clear of bank debt. In 1939 the last note at the bank was paid off. It had been a long, hard struggle, but eminently worthwhile. The stockholders, the shopmen and the banker—the whole community in fact—were benefitted as was the nation!

In 1942, the management and employes took pride and satisfaction in helping industry retool. In this small plant in the first war year was built almost $2½ million worth of the most critical machine tools required by industry to produce millions of armament parts for the fighting forces.

As a taxpayer it shared the costs of war in proportion to its income, and in cooperation with the government in holding down war profits, it agreed to submit to renegotiation proceedings.

Summarizing the firm's 3-year operations from Dec. 31, 1941, to Dec. 31, 1944, renegotiable sales were $5,250,000, representing 85 per cent of the total volume. Profits of $1,207,000 were earned on renegotiable sales. Income and excess profits taxes covering both war production and the commercial profits were $1,203,000. The Price Adjustment Board determined that "excessive profits" existed on renegotiable sales to the extent of $605,000. After the revenue department recomputed the taxes each year the company was required to refund sums totaling $119,000.

Therefore, after payment of taxes and renegotiation the net profit amounted to $195,000. This was a progressive return on its net worth of 18 per cent. The company paid $30,000 dividends in the three years, thereby adding $165,000 to its net worth. Working capital was enhanced by $29,000 and equipment and plant assets were increased by $108,000, and $28,000 was in excess profits refund credit bonds.

As this is not an exceptional case, but quite representative of thousands of small war contractors, it is presented as a typical experience. It raises two questions: How did the Price Adjustment Board determine that in the respective years, X dollars were "excessive profits" and secondly, how might renegotiation refunds adversely affect the employment situation after the war.

High taxes are the inevitable evil companions of war. Some idea of the tax picture may be gained from a paragraph appearing in *Fortune*, May, 1945, issue: "The steel industry in 1917 made more than three times as much money after taxes as in 1944 on a little more than half as much as steel." There was no renegotiation in 1917. It is noteworthy that our present excess profits taxes are scaled as high as 95 per cent of sales.

Every man in a manufacturing plant knows that production cannot be evenly measured off by days or months. The production key, of course, is the backlog, and the grouping of items in lots for simultaneous production. Therefore, if production does not conveniently fall into regular, uniform units, sales and its resultant profits will be equally uneven. Fiscal years are purely for the convenience of accountants, and of course the tax collector and renegotiators.

### Careful Budgeting Necessary

Corporations, partnerships or private ownership enterprises, like individuals, have to come up with cash when settling their annual tax liability. This is also true when making renegotiation refunds. This takes extremely careful budgeting because profits are not always visible in cash. To prepare for succeeding commitments, profits might easily have been converted into new inventories; in equipment (as was the case in the company I described) and in accounts receivable. In addition to meeting the taxes, part of the company's profits must carry the invisible ear-mark of cash for the "tide-over" or "reserve-building" for the inevitable cyclic period of depression. And, of course, every good management has payroll reserves for a couple of months period to tide over terminations of part or all backlog. Other invisible ear-marks are replacements of worn-out equipment and constant expenditures for improvements of old products and development of new ones. In short, the lean and hungry policy of management as regards the husbanding of cash may easily be the difference between a solvent company and a sheriff's sale two years after victory.

The concern which I described has a current average shop payroll of 350. Among the members of the National Association of Manufacturers there are 12,000 companies that employ fewer than 500 people. The large majority of these, while regarded as "small," are subject to renegotiation. Yet less than half of the

## TERMINATIONS

**Commitments canceled by contract terminations during May totalled $5,100,000,000, compared with $1,800,000,000 in April, Robert H. Hinckley, director of contract settlement, reported last week.**

**"During May the settlement rate was increased to $1,700,000,000, compared with $800,000,000 per month during the third quarter of last year," Mr. Hinckley said. "It is expected that the rate of settlement will rise further between now and September. In August and September, settlements should be above a $2,000,000,000-per-month rate, since by that time claims will have been filed or waived, and settlement reached on a considerable portion of the terminations made in April and May."**

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corporate revenue of the country is subject to renegotiation.

The small manufacturer eyes the hotels, railroads, mines and mercantile establishments which are exempted from renegotiation and in consequence have been able, because of war business, to retire bonds and put away reserves for future use. He also questions why the "tiny" manufacturer with less than $500,000 war production annually is screened out as being too small for the renegotiators to bother with. Yet he must go through the wringer of both renegotiation and taxes with the result that he faces virtual confiscation of his reserves. There is in this uneven burden of war taxation an element of discrimination which is new and unwholesome.

The small manufacturer who is subject to renegotiation may have an advantage which should be capitalized. By making known his renegotiation troubles he can let his employes know that for him the war has not been all "beer and skittles." Andrew Carnegie once said that the human side of an organization is the most important aspect of business. Emergencies have a way of unifying men through a spirit of helpfulness. In the approaching postwar period management and men jointly will face an emergency no less grave than the one we are passing through.

The link between the manufacturer and the shopmen is the foreman. He must keep costs in line; he must have accurate knowledge of production. He attends conferences with the management. He can best interpret to his men the nature, the moods, and the trials of their management. He can acquaint them with the current and postwar problems which bear directly upon the ability of the management to survive and continue to provide employment.

**Foremen Should Be Well Informed**

The foreman is likewise the first operating man with whom GI Joe will work. The more informed he is regarding business in general and his company in particular, the more he can impart an understanding of business and industry's problems to the ex-service men who have been out of touch with industry. For example, there is the importance of knowing what renegotiation is and how it works!

Physicians may not confirm this, but businessmen certify that the money nerve is just over the heart. Most small manufacturers in war production found their earnings placed them in at least the 80 per cent tax bracket. It was not until April 28, 1942, when the Renegotiation act was passed they learned that in addition to being taxed, they would be subject the renegotiation. It was well into 1943 before the 1942 annual operations were reviewed and the first determinations on renegotiation announced. To say these manufacturers were surprised at the amount of cash refunds requested would be an understatement. Managements were too stunned at first even to phone their congressmen! The situation was somewhat like the editor who told his reporter they couldn't put him in jail. "I know," said the reporter, "but I'm phoning from there."

With very good reason, these small war contractors sought the required official approval so as to be able to pay their men higher wages. It would have cost the companies nothing, for whatever wage increases were approved would have been borne by the government inasmuch as the taxes and renegotiation refunds would have been just that much less. But the wage stabilization board met these requests with little show of enthusiasm, in line with the restraints imposed by Congress to check inflation. To offset pirating of workers by new war industries, whose wage-scales had not yet been established was still another reason, as was the manufacturer's earnest desire to meet the rising cost of living of his men and enable them to accelerate the payments on their home mortgages.

Certainly there is little doubt that renegotiation has disturbed the small manufacturer in war production more than any phase of the war. With a scarcity of office help, it was necessary to prepare comprehensive analyses of the company's operations; then there were repeated visits to the Price Adjustment Board and in some cases travel to Washington all of which consumed much nervous energy and time which could be ill-spared from plant direction. The large corporations, with full administrative staffs and adequate counsel experienced relatively little pressure from these proceedings.

In determining whether a concern has made "excessive profits," renegotiators say that many other factors besides the rate of profits must be taken into consideration. The principal ones are the volume which is renegotiable, that is, products of business during a fiscal year period whose end-use is directly or indirectly for the war. Other factors are the degree of speed with which companies have met their delivery schedules, the care with which they have used labor and conserved material, the cost at which they have been produced, the inventive and management contributions which they have provided, not only for their production but which they have provided to help other people engaged in the war effort. Also the source of capital which is used in making war products; whether or not a company used government facilities or financing. Another criterion is the general performance of the company in handling its production and the efficiency or lack of it with which its operations have been conducted. The factor of cost of manufacture is the biggest single factor in arriving at an allowable profit. As volume of business increased over the year preceding the rate of allowable profit is lowered. Other indexes are the quality of

(*Please turn to Page* 196)

## TRANSITION TOPICS

**RECONVERSION**—Simplified priorities system designed to cushion shock of changeover to limited civilian goods production during second half of 1945. Many controls and restrictions lifted. See page 71.

**ECONOMIC CHARTER**—War Mobilization and Reconversion Director Vinson offers nine-point postwar program. Asks modernization of tax law structure. See page 73.

**LABOR**—Shift in administration's labor policy may follow wave of strikes in critical industries. See page 74.

**SURPLUS PLANTS**—Competitive, independent ownership of western steel plants recommended by retiring attorney general. Tin plate called key to successful, continuous operation of war-born facilities. See page 76.

**SMALL BUSINESS**—Commerce Department will attempt to increase assistance to small business. See page 80.

**AIRCRAFT**—Technical advances of war period will have profound influence on postwar aviation, particularly in jet propulsion, pilotless planes, rocket power, radar and micro-wave techniques. See page 94.

**INDUSTRIAL X-RAY**—Place to be taken by X-ray after reconversion of industry will be determined by its record. Efficient use of metals, fewer rejections and lower costs afforded by medium seen as cause for expansion. See page 102.

**THERMIT CASTINGS**—Thermit welding process, having proved adaptable to production of steel castings, makes available to industry a new source for limited quantities. See page 105.

# Commerce Department Will Seek To Expand Plans To Aid Small Business

*Advisory committee recommends department increase assistance to little firms in finance and credit, technical advice and in obtaining tax laws that will not unduly burden them and restrict expansion and employment*

A LIVELY contest for the peacetime stewardship of small business is expected to open this fall when the Department of Commerce asks Congress for a larger appropriation to enable it to give increased assistance to the segment of the economy which falls into this category. At present, at least three government agencies are catering to small business, a situation in which exists considerable duplication of effort and personnel.

Most active agency working in behalf of small business is the Smaller War Plants Corp., created by Congress in June, 1942, as a war agency. It was believed at the time there should be more small business participation in war production and to reach this objective it was necessary to set up a new agency with authority to book prime contracts and sublet them to small business, to lend money to small plants going into war production, and render other assistance to small business.

At the time the creation of the Smaller War Plants Corp. was under discussion there were numerous criticisms that Jesse Jones, then secretary of commerce and federal loan administrator, was failing in both these posts to give sufficient help to small business. In particular, Mr. Jones was accused of a loan policy which helped big business.

As a result of these criticisms, Mr. Jones took two principal actions. The Small Business unit which he had established in December of 1941 in the Bureau of Foreign and Domestic Commerce was expanded into the Small Business Division of the department in the spring of 1944. At the same time, he adopted a more liberal publicity policy at the Reconstruction Finance Corp. and the releases which the RFC handed out laid more emphasis on loans the RFC was making to small business.

The Smaller War Plants Corp. encountered rough sailing at the start of its career. It was a new organization and its policies and methods had to be built from the ground up. It had difficulty in enlisting the services of competent engineers and financial men. It made slow progress in winning recognition from the various procurement agencies, as the Army and Navy, which had established their buying methods and were reluctant to place contracts with the SWPC for subcontracting by the latter.

Eventually, under a lot of needling by members of Congress, and with additional grants of authority from Congress from time to time, the SWPC began to make itself felt. This has been especially the case since energetic Maury Maverick became its chairman at the start of 1944. From the start, Mr. Maverick has viewed his present job as a crusade, and he has breathed fire night and day against the foes, real or fancied, of small business. In addition to his ability to speak and write forcefully and colorfully at a moment's notice, Mr. Maverick has organized a high-powered publicity staff that is the envy of many other government agencies. Especially envied is the ease and facility with which Mr. Maverick obtains ever larger grants of authority from Congress.

Today the SWPC has authority to give technical and other advice to small business in general. It has authority to grant or guarantee loans to small business. It books prime contracts from the government and subcontracts them to small business. Its chairman is a vice chairman of the War Production Board, by mandate of Congress, to see to it that small business gets fair treatment from the WPB. The SWPC also has specific mandates under the Surplus Property Act and the Contract Settlement Act to protect small business, and particularly the interests of World War II veterans, in the administration of these acts. The SWPC has a large headquarters staff in Washington to direct its manifold activities; it has regional offices in Boston, New York, Philadelphia, Atlanta, Cleveland, Chicago, Kansas City, Dallas, Denver, San Francisco, Detroit, Minneapolis, Seattle and Los Angeles.

### Congress Considering New Proposals

In line with his policy of always planning something bigger and better, Mr. Maverick now has a number of requests before Congress. He recommends enactment of a loan insurance plan aimed at encouraging the banks to lend more money to small business, with SWPC guarantees. He urged a comprehensive program under which the SWPC would seek to increase small business participation in export trade. Also, he asks for a larger appropriation to permit expansion of the SWPC's Technical Advisory Service which, says Mr. Maverick, "is the biggest and best idea developed in this war."

That was the situation Henry A. Wallace encountered when he, on March 2, 1945, was appointed to succeed Mr. Jones as secretary of commerce. It bothered him a great deal for Mr. Wallace, on the one hand, had very definite plans for improving the country's general economic level by encouraging prosperity for small business; on the other hand, the Small

**CARRY ON: A preparatory commission, named as the final official business of the San Francisco conference, plan to carry on the conference work. Members, left to right: Dr. Hsu Mo, Chinese ambassador to Turkey; Dr. Leo Pasvolsky, United States Department of State official and acting chairman of the commission; Alger Hiss, secretary-general of the conference; and Herbert Evatt, chairman of the Australian delegation. NEA photo**

# Have you seen the new day coming?

Even in the pre-dawn darkness of war there are signs that it is on the way. . . . It *can* be the greatest day the world has ever known.

Already men, materials and American ideals have penetrated to the last wildernesses of the earth. There's a trans-Atlantic flight every 13 minutes of the day and night . . . 160,000 miles of air routes being flown by American transport planes . . . our air strength is double that of the rest of the world combined . . . our manufacturing productivity half of the world's total capacity. We have what it takes to *force* prosperity and to *enforce* peace.

We at Bryant feel that we're part of the new day that's coming. Our record in war links us with great production achievements, from the millionths-of-an-inch precision in the modern airplane engine to the millions of things that we'll help to produce more simply, faster, for less. We urge you to call us in now!

BRYANT CHUCKING GRINDER COMPANY SPRINGFIELD VERMONT, U.S.A.

Business Division of the department was being operated on a very skimpy and inadequate basis.

One of the first things Mr. Wallace did was to appoint a Small Business Advisory Committee to study the needs of small business and determine what the government should do about the problem. This committee submitted its report to Mr. Wallace on May 28—and Mr. Wallace was much pleased with it. Since then, the report has received continuous study by department officials; there have been and continue to be numerous conferences on how the department should organize, and what sort of policies it should adopt, to give effect to the Small Business Advisory Committee's recommendations. Not the least of the difficulties facing the department is that of meeting the competition of the Smaller War Plants Corp. when it asks Congress for a larger appropriation to enable the department to build up its small business service.

The Small Business Advisory Committee report on which the department now is building its case states unequivocally that the Department of Commerce "is the proper government agency to interpret the small business problem to the government, to recommend a course of action, and to execute the plan. The facilities of the department appear to be organized along a proper pattern for this objective, but we do not believe that the facilities are adequate to cover the many phases of a desirable program."

The report calls for a planning staff at the policy level to consider the basic problems of small business, such as the ability of small business to compete with big business. This planning staff would study legislative proposals affecting competition, taxation, finance and other basic factors. It would deal primarily with the activities of the Bureau of Foreign and Domestic Commerce, but would work in close contact with Congress, the Treasury Department, Federal Trade Commission, Department of Justice and other government agencies whose activities have a bearing on small business. It also would conduct an educational study.

A digest of the main body of the report follows:

**Taxation** — The tax system should: 1.—Provide adequate revenue to protect the credit of the United States and safeguard the monetary system; 2.—should not impose burdens on business which restrict expansion of production and employment, discourage the opening and development of new and small business, affect adversely the competitive position of small as compared to large business, or influence business decisions unduly; 3.—should distribute the tax burden equitably among all income levels insofar as that is consistent with objective No. 2; for example, the tax burden must not fall so heavily on any group as substantially to affect incentives to produce or invest or to restrict unduly the demand for consumer goods.

### Recommends Revision of Tax Laws

To permit small business to build up adequate liquid working capital, and to obtain immediately funds rightfully theirs under the present tax structure, the report recommends these changes in present tax legislation: 1.—Increase earnings exempt from excess profits tax from $10,000 to $25,000 effective Jan. 1, 1946; 2.—repeal the excess profits tax as of the beginning of the year following cessation of hostilities with Japan; 3.—permit corporations to take their 10 per cent excess profits tax credit for 1944 and subsequent years as a deduction against tax payments for those years; 4.—advance maturity of bonds representing 10 per cent excess profits tax credit for 1941 through 1943 to Jan. 1, 1946; 5.—modify immediately the carry-back provisions to permit postponement of current tax payments on the previous year's taxes to the amount of estimated refunds accruing under present provisions as a result of subnormal earnings.

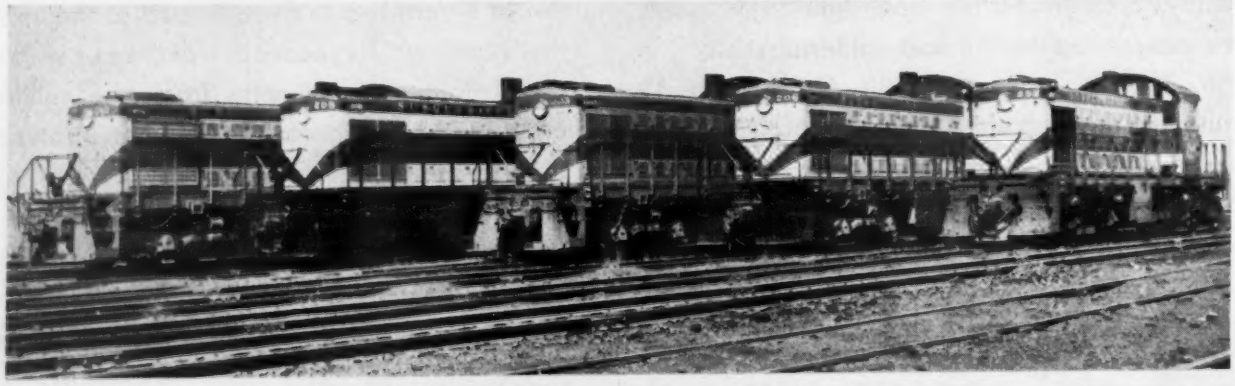
The report recommends speeding up amortization refunds, also a modification of carry-back provisions applying to deficits to make immediately available liquid working capital which would eventually belong to the company under present law.

**Management Aid**—Where larger business organizations have the facilities for investigating, studying and solving their own management problems, the smaller operators must look elsewhere for such aid, the report says. It recommends that the department conduct a large number of specialized studies and publish reports. In particular there should be a "going into business" series of reports.

The report recommends that the department reprint for civilian use the series of books prepared by the Army on establishing and operating different kinds of business. It also recommends creation of a new series of books to describe operations involved in different kinds of business and manufacturing. It recommends also more frequent and more diversified census studies.

**Finance and Credit** — A substantial demand for long-term funds by small business is foreseen in the report. In order that these funds may be forthcoming, the department is asked to sponsor a scheme involving government guarantee of long-term loans made by private financing institutions; a new, special type of low-interest loan should be developed, to be liquidated in 10 to 15 years, and to be negotiated without encumbering receivables, inventories and other current assets. Also, the report recommends, the department should study the extent to which the government should make direct loans to small business, the credit problem of small business in the export field, the credit problems of returning veterans, and the problems of small, particularly new, producers whose liquidity is endangered by payment of taxes.

The Small Business Advisory Committee which drafted this program that now is the major item of new business for Department of Commerce officials comprises: Ivan Allen Sr., chairman; Walter Ringer, vice chairman; Vincent L. Browner, Ernest G. Draper, W. E. Harber, Lou E. Holland, E. H. Lane, Stacy May, John R. Pinkett, Prentiss M. Brown, Ralph Flanders, Eric Johnston, A. W. Lutz, Morris S. Rosenthal, George Rupple and John W. Snyder.



**ALL DIESEL UNITS: These diesel-electric locomotives built by General Electric and American Locomotive Co. for the New York, Susquehanna & Western Railroad are making that railroad the first in America completely equipped with all diesel-electric units. The Susquehanna line bought 16 of the new locomotives**

# PRIORITIES–ALLOCATIONS–PRICES

**Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration**

## REVOCATIONS

**MACHINE TOOLS:** Order L-147, which prohibited special electrical specifications for machine tools, except in specified circumstances, has been revoked. Manufacture and delivery of machine tools remain subject to all other applicable WPB orders and regulations. (L-147)

## AMENDMENTS

**CONTROLLED MATERIALS:** Direction 44 (steel not needed by producers or distributors to fill authorized controlled material orders) to CMP regulation 1 and Direction 5 (disposal of controlled materials procured by a warehouse or distributor for his stock from idle and excess inventories) to CMP regulation 4 have been revoked, since they became obsolete with open-ending of CMP on July 1. (CMP 1, 4)

**CAST IRON BATHTUBS:** Direction 6 to Order L-42 has been revoked. This direction required manufacturers to apply to WPB for authorization to produce cast iron bathtubs; limited sales to purchase orders from the military, for authorized construction projects, and to farmers whose applications had been approved by WPB, and other specified users. (L-42)

**CASKETS:** Iron, steel, copper and aluminum now may be used in production of caskets, shipping cases and burial vaults without limitation. Tin, antimony, antimonial lead, lead or zinc may be used in production of burial units only to the extent that such use is not restricted in orders M-43, M-112 and the M-38 series and the M-11 series. All restrictions in Order L-64 on the use of metal in production of metal liners have been deleted, including the necessity to obtain certificates of essentiality for the use of metal liners. Metal limitations also have been removed on production of casket-handle hardware and casket corners, which are still subject to the restrictions on the number of designs permitted by L-64.

The order's schedule A specifications on casket designs and dimensions do not apply to the production of caskets, burial vaults or shipping cases made of metal, or of plastic caskets, nor do they apply to any type of shipping case or burial vault made or assembled for military orders.

Restrictions on painting, coating or staining burial units have been deleted from the order, while schedule B has been added, limiting the use of cotton and rayon fabrics in caskets. (L-64)

**PLUMBING EQUIPMENT:** AA-3 rating assigned to distributors for purchasing plumbing, heating and cooking equipment, with certain exceptions, may not be used for purchasing metal bathtubs. (L-79)

**LEAD:** An increase of 25 per cent in third-quarter allocations of lead for automotive batteries over the second-quarter allocations has been granted. This means that 900,000 more batteries can be produced in the third quarter, for a total of 4,700,000. Allocations have been increased to 25 per cent of the 1944 use for that purpose compared with 20 per cent on the same basis during the second quarter of this year. (M-38)

**CONSTRUCTION:** AA-3 preference rating and allotment symbols H-1, H-2 or H-3 assigned by Order P-55-c may be used for all materials to be used in projects approved by the National Housing Agency, except as specifically prohibited or restricted by schedule I and schedule II of the order. (P-55-c)

## INSTRUCTIONS

**ELECTRONIC EQUIPMENT:** Production, distribution and sale of transformers, resistors, capacitors or other radio components designed for use in equipment not involving the use of vacuum or gaseous tubes or designed for use in equipment specifically excluded from order L-265 are not subject to the restrictions of that order. Consequently, such components may be manufactured and sold in accordance with Priorities Regulation 1 and other applicable WPB orders and regulations.

## PRIORITIES REGULATIONS

**CLASS B PRODUCTS:** Any class B product manufactured on an authorized production schedule may be sold to fill any orders received, whether rated or unrated, as long as rated orders are given the precedence required by Priorities Regulation 1 or other applicable regulations or unless a particular WPB order provides otherwise. This is true even though the CMP-4B application (for controlled materials) was filed with the expectation that all sales would be made on rated orders or on particular orders, and even though all production materials required were obtained by the use of priorities assistance. (PR-1)

## PRICE REGULATIONS

**CONSUMER GOODS:** Seven items of consumer durable goods have been added to the list of commodities on which manufacturers may apply for price increases in some circumstances involving production at a loss, effective July 4. These items are: Carpenter's planes, compass saws, hand saws, lineman's pliers, toy embossed wooden blocks, wire-tied box springs and wooden domino and checker games. Manufacturers whose ceilings for these items are below the prevailing price for the same items may apply for a price increase in either of the following circumstances:

1. If the applicant's entire manufacturing operation is being conducted at a loss, or will be so within 90 days.

2. If his manufacturing operation as a whole is being conducted at a profit, but the maximum price of the article in question is below his manufacturing and packing cost. Shipping cost, where delivered prices are quoted or where the manufacturer is permitted to pass on to the buyer all or part of the freight cost, may be allowed in this case.

Toy manufacturers newly entering the field have been made subject again to the requirement that proposed ceiling prices for new products be expressly approved by OPA before sales are made. They have been made subject to the "fourth pricing method" of the consumer durable goods regulation which requires manufacturers, who are unable to fix their own ceiling prices by reference to ceilings of the same or comparable items of their own manufacture, to apply to OPA for a prcie. (No. 188)

## Consumers Durable Goods Division, WPB, Reorganized

Consumers Durable Goods Division, War Production Board, has been reorganized to facilitate the output of war-essential items and the reconversion to civilian production during the transitional period between V-E and V-J days. The announcement was made by Stanley E. Adams, director of the division.

Furniture and Household Goods branch and Photographic and Personal Goods branch have been consolidated in a new administrative unit, the Household and Personal Goods branch, with George D. Morton as chief.

Wendell S. Kuhn has been assigned to head a new Houseware and Personal Goods section of the new branch which includes the following items: Lawn mowers, bicycles and powercycles, office supplies, military insignia, clocks and watches, church goods, houseware, personal goods, sporting goods, food serving equipment and musical instruments.

Winston A. Bryant will take over Mr. Morton's former responsibilities as head of the House Furnishings and Morticians' Goods section, which is unchanged in its activities. The Metal Furniture section remains under the direction of John L. Rowland, and the Photographic section continues under Lincoln V. Burrows.

Organization of the Electric Goods branch of the division has not been changed, still consisting of the Appliance section and the Lamp and Battery section.

## WPB Clarifies Construction Restrictions in Scrap Yards

Amount of construction work that may be done in a metal scrap dealer's plant in a year without War Production Board authorization depends on whether the type of business is industrial or commercial, War Production Board explained recently. If the plant manufactures, processes or assembles goods, the scrap dealer may spend up to $25,000 on construction work in a year without WPB authorization, under terms of order L-41. If the type of activity is commercial, the exemption for construction work on the same basis is only $5000.

A scrap dealer's plant is considered industrial if it is primarily engaged in such processing operations as baling, pressing or briquetting light iron, cutting up heavy melting steel, breaking up cast iron, detinning cans or smelting nonferrous metals for the purpose of making the scrap available for further use. It is considered commercial if it is an automobile graveyard where automobiles are taken apart and the parts sold without change; or a yard where items are sorted and cleaned.

## Appointment

R. C. Allen of Oglebay-Norton & Co., Cleveland, has been appointed deputy vice chairman of the Office of Metals and Minerals, War Production Board. Mr. Allen resigned in August, 1942, as deputy director of the Steel Division in charge of raw materials to return to Oglebay-Norton.

# Vast Materia

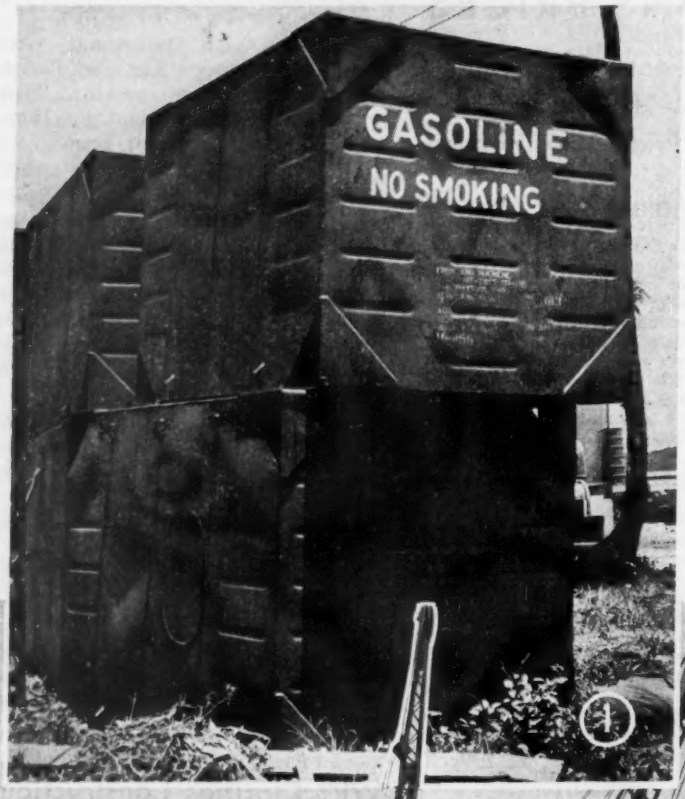



*Fig. 1—Pontoon tanks fabricated from steel plates serve a wide variety of uses at Pacific bases. Here they have been adapted for gasoline storage tanks*

# Needs Pose Huge Logistics Task

EQUIPMENT and materiel requirements for waging war in the Pacific are vast and varied. Thousands of supply items already have been transported halfway around the world to support United States forces driving toward Japan. In many cases, circumstances necessitate ingenious use of this material, often for purposes other than that for which it was originally designed. The accompanying Navy photographs indicate the immensity of the Pacific supply problem.

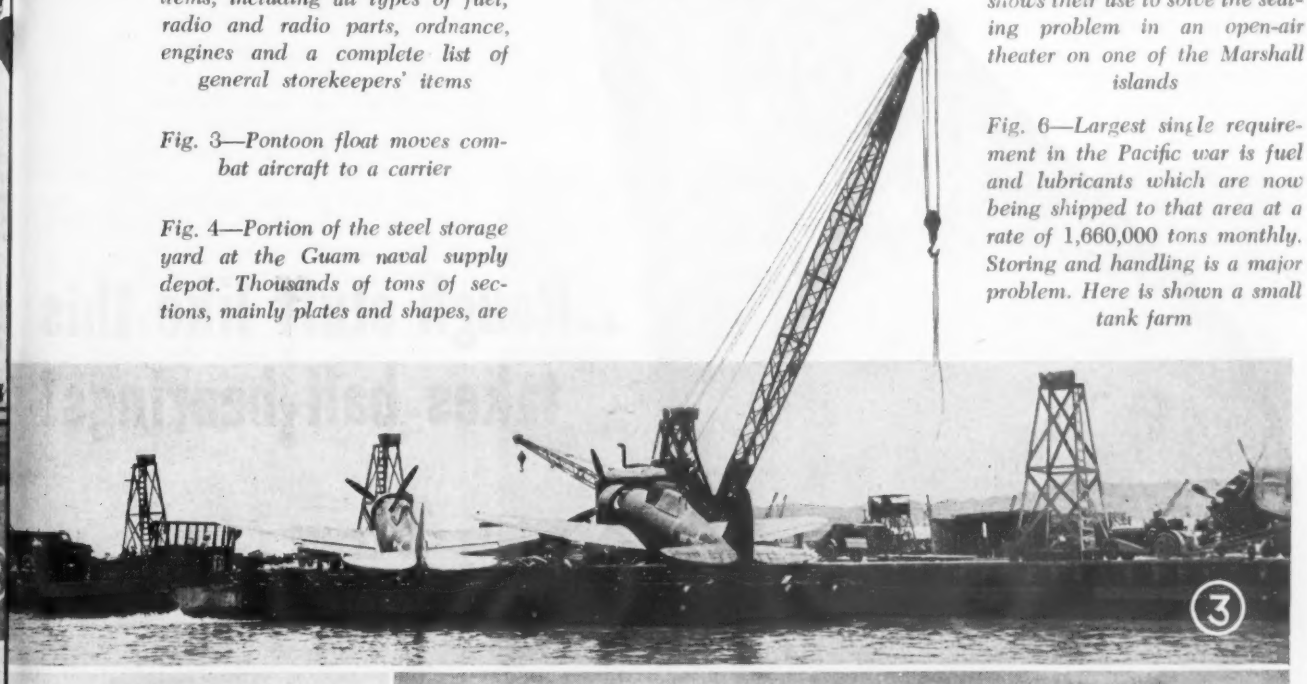
*Fig. 2—Stock of derricks at the Guam naval supply depot, ready to be moved wherever needed. The depot carries more than 100,000 items, including all types of fuel, radio and radio parts, ordnance, engines and a complete list of general storekeepers' items*

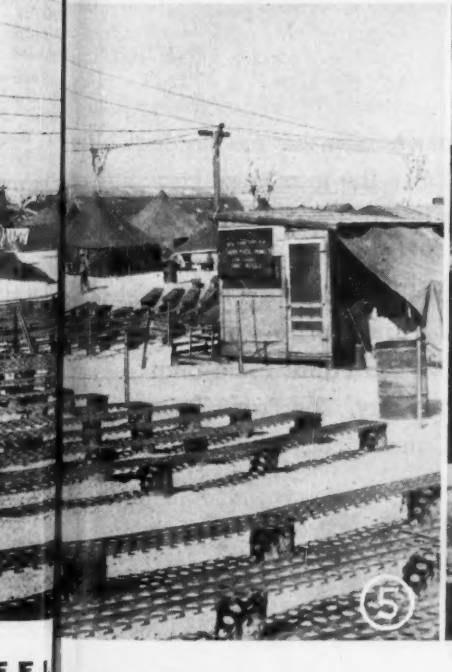
*Fig. 3—Pontoon float moves combat aircraft to a carrier*

*Fig. 4—Portion of the steel storage yard at the Guam naval supply depot. Thousands of tons of sections, mainly plates and shapes, are available in a range of sizes to meet all the Navy's needs*

*Fig. 5—Steel landing mat sections are finding numerous uses which their designers probably did not have in mind. They are widely used for fencing and walkways on coral islands. This view shows their use to solve the seating problem in an open-air theater on one of the Marshall islands*

*Fig. 6—Largest single requirement in the Pacific war is fuel and lubricants which are now being shipped to that area at a rate of 1,660,000 tons monthly. Storing and handling is a major problem. Here is shown a small tank farm*





# STAND BACK, Paul Bunyan..

## ..Rough stuff like this takes ball bearings!

Out in the Pacific Northwest country the trees are even taller than the lumberjack's stories. Getting one of these monster Redwoods or Douglas Firs down is a job but nothing like the job of getting it up . . . and out. They have a machine out there for doing that which makes Paul's blue ox, "Babe", look like a yearling calf. It's a heavy-duty hoisting, towing rig for hooking up to the power take-off of a tractor. It'll pull up to 45,000 pounds at the rate of 79 feet a minute. And one of the features that enables this mechanical blue ox to handle several times the maximum capacity of the tractor itself is the use of large-ball, deep-groove Fafnir Ball Bearings. It takes this Fafnir "balanced design" to take this kind of rough-and-tumble shock.

If that's the kind of bearing performance you want, then you want to talk with a Fafnir Field Engineer. Write us in detail today. The Fafnir Bearing Co., New Britain, Connecticut.

★ 2196

MOST COMPLETE LINE IN AMERICA

**FAFNIR** BALL BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

# MIRRORS of MOTORDOM

***Ford gets started on new passenger car production. Willys authorized to build 20,000 civilian jeeps over remainder of year. Quotas set by War Production Board trim down large producers, give advantage to smaller builders***

STARTING bell has sounded, and by the time this appears in print Ford will have rolled a few 1946 models off assembly lines. July schedule is reliably reported to call for completion of 200 jobs, with around 4000 slated for August, 8000 in September, and 9000 monthly over the balance of the year, assuming it will be necessary to stay within the quota allocation of 39,910 covering the last half of the year. First Fords were slated to be christened Tuesday, July 3, and rush calls were going out to various suppliers for certain final trim parts to be in the Rouge plant for sure on July 2.

A rash of strikes in various Ford departments over the past three weeks, springing principally from the conflicts between AFL and CIO maintenance crews and machinery movers, has not eased the Ford reconversion picture any, but orders from R. J. Thomas, president of the UAW-CIO, for all maintenance workers in plants where strikes were in progress to report immediately for work served to clear the air somewhat.

Meanwhile Willys-Overland in Toledo, O., is showing the press its civilian jeep model next week Monday, followed by a demonstration at C. E. Sorenson's farm in New Hudson, Mich., on Tuesday. Willys has been given WPB authorization to build 20,000 civilian jeeps over the balance of the year, over and above the company's passenger car quota of 8000. Company officials believe they can sell even more jeeps than are planned, but must carry along production of the military version, contracts calling for something like 90,000 more of these, running into the last quarter of 1946. Outwardly the civilian jeep closely resembles the military model, except that the spare tire is mounted in the right side, while the top appears to cover only the front seat.

### Ford Has Head Start

With Ford apparently getting the jump on the rest of the industry as far as initial production is concerned, the pressure is now on Chevrolet and Plymouth. Of the two, it is likely Chevrolet will be the next of the Big Three to have assemblies under way. First shipments of parts were scheduled to be in Fisher Body plants on July 2, so it will be unlikely to see any finished bodies ready before the end of the month; whether chassis will be ready to receive them as yet is not clear.

Comparison of 1941 production history percentagewise with new authorizations for passenger car production shows how the larger manufacturers were trimmed down on their quotas to permit larger assignments to the smaller manufacturers.

| | Per Cent 1941 Production | New authorization |
|---|---|---|
| General Motors Corp. | 48.41 | 41.29 |
| Chrysler Corp. | 23.13 | 21.55 |
| Ford Motor Co. | 18.57 | 17.33 |
| Studebaker Corp. | 3.17 | 4.03 |
| Hudson Motor Car Co. | 2.10 | 3.13 |
| Packard Motor Car Co. | 2.12 | 2.91 |
| Nash-Kelvinator Corp. | 1.74 | 2.83 |
| Willys-Overland | 0.71 | 2.31 |
| Graham-Paige | ... | 2.31 |
| Crosley Corp. | ... | 2.31 |
| Miscellaneous | 0.05 | ... |
| | 100.00 | 100.00 |

Latest production authorization made by the WPB covers another 100,000 trucks and commercial cars, bringing revised 1945 totals to over 540,000, or already twice the total allocation of passenger cars. While military requirements are included, they constitute only a small portion of the total which is principally in the light and medium truck classifications.

Increase of 20 per cent in third-quarter lead allocations for automotive batteries has been granted by the WPB. This will permit production of 900,000 more storage batteries over the original 3,800,000 scheduled for the third quarter.

Detroit Ordnance District has announced the Fisher Body tank contract for M-26 heavy tanks built at the Grand Blanc, Mich., tank arsenal has been rescheduled downward to effect termination in April, 1946. The rescheduling will effect approximately 3000 tank units and spare parts with estimated value of more than $211 million, over a period of ten months. However, negotiations are under way which will place additional

INCENDIARY BOMB: K. T. Keller, president, Chrysler Corp., holds a "Tokyo Firefly," a new incendiary bomb which weighs ten pounds and throws off 40 globules of flaming oil. Chrysler has received a contract to produce 7,500,000 of these bombs at its Evansville, Ind., ordnance plant. NEA photo

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contracts for combat vehicles in the plant, what type it is not revealed.

DOD also discloses reduction in the production of truck cargo bodies at Covered Wagon Co., Mt. Clemens, Mich., covering 1700 bodies valued at $495,000 over a period of six months. No labor displacement will occur before September. The company has supplied over 21,000 of these bodies since Pearl Harbor.

Toledo ordnance officers report the Bullet Core Division of Willys-Overland has ceased production of 0.30 and 0.50 caliber ammunition, with the plant equipment retained on a standby basis. Reductions also have been made in schedules for 155-millimeter shells, affecting 500, in addition to 400 affected by the bullet core termination.

Michigan leads other states in reconversion construction applications. Out of a national total of $155 million approved by the WPB for necessary immediate construction work, plants in this state account for 204 of a total of 754 applications, the automotive industry in the forefront with 193 approved applications involving $115 million. Refrigerator manufacturers were second with 44 requests totaling $4,750,000.

Ford has announced purchase of a 100-acre tract of land at St. Louis for construction of an assembly plant with daily capacity of 500 cars. Employment at the new plant, located near the St. Louis airport, will total approximately 3000. About 700,000 square feet of floor space will be provided in the one-story 520 × 1500-foot structure. Concurrently the company is offering for sale a 374-acre tract at the confluence of the Meramec and Mississippi rivers which has been owned for several years and was considered for a time as a site for the new assembly plant.

Other proposed plant expansions include purchase of an additional 40 acres of land by Chrysler Corp. adjacent to its parts buildings at San Leandro, Calif. Verne G. Orr, vice president of Chrysler Motors of California, in a recent talk before the San Leandro Chamber of Commerce, emphasized the difficulty the average citizen will have in purchasing any passenger cars built this year, and said 55,000 units of authorized production would be needed for dealers' samples. Questioned as to what Chrysler proposed to do on the new property, he declined to be specific other than to say, "We certainly aren't going into the truck gardening business."

### Parts Price Policy Uncertain

The automotive parts industry advisory committtee met in Washington recently with OPA officials, with no result so far as any tangible indication of OPA's eventual action on parts prices. Session was devoted mainly to exploratory questions, although the committee did vote unanimously against any flat industry-wide percentage increase factors as unfair and impractical; and for increase factors to be applied on a company basis, or at the option of the manufacturer, on a product-group of individual product basis with each company. The committee pointed out to OPA that even if the parts-makers did have a suitable price formula today, many could not figure prices until the OPA had also set its policy for components such as steel and gray iron castings, forgings, screw machine parts, etc. Early action on these basic items seems imperative.

Last bomber from the Ford Willow Run plant was wheeled onto the flight apron June 28. It was No. 8685 and originally was scheduled to be christened Henry Ford. However, he preferred to have his name left off and suggested plant employes autograph the ship instead. The vast bomber plant is now an eerie place with some of the equipment moved out and virtually all production operations suspended.

Latest proposal for utility of the plant has been made by Walter Reuther of the UAW-CIO, who suggests the union itself consider the possibility of acquiring the plant under lease for production of prefabricated housing elements. His suggestion is probably just an effort to "needle" Henry J. Kaiser into taking some action on the suggestion made to him by R. J. Thomas of the UAW-CIO that his organization consider the acquisition of Willow Run. Kaiser is known to have extensive plans in the prefabricated housing field.

At the moment it does not appear likely Ford will conclude arrangements to occupy a part of Willow Run for manufacture of tractors and implements. The Ferguson tractor interests have announced plans to move eventually toward production of 1,000,000 tractors annually, priced at something over $500, supplemented by a line of 60 or more attachable implements. This is no small potatoes as far as manufacturing is concerned, but the plan now appears to be to house this activity in the Ford Highland Park plant rather than at Willow Run.

### Transportation Is Problem

With a fair volume of passenger car production now perhaps only a few weeks away, one of the unanswered questions is how assemblies are to be moved out to dealers and customers. Rail shipment probably will be difficult if not impossible. Driveaway trailers have been set aside in storage lots long since, and even if they were available there is the little matter of gasoline. So far as is known, there are no OPA provisions covering allocations of gasoline to the driveaway of new passenger cars.

Another problem looming in the near future is a possible collapse in used car prices, accompanied by reluctance on the part of dealers to accept trade-ins because of old age and extensive amount of service and repair such used cars will require.

Official decision on what amount and degree of plating will be allowed in passenger cars is expected to develop at the auto industry meeting in Washington this week. Betting is that for the present nickel will be excluded, forcing platers to use the chrome-on-copper method which was necessary for the final run of 1942 models.

HELP TO DISABLED: World War II veteran, Ted Jones, right, discharged from the Marines after losing both his lower arms and one leg, finds a job despite his handicaps. He shows how metal tabs on the A. O. Smith Corp.'s rate book, combined with Alnico steel-tipped pencil, magnetizes the pages to facilitate turning them. NEA photo

# Beat Competition by BEATING RUST

Plan your product to be a winner .... in the face of keen future competition....by using Harper Everlasting Fastenings—the fastenings that (1) resist rust and corrosion, (2) stand up in the presence of many acids, alkalies and other tough conditions, (3) add years of service life AT LOW COST, (4) can be removed with ordinary tools and used again and again. Every Harper fastening is made of either brass, copper, naval bronze, silicon bronze, Monel or stainless steel (nothing in common steel).

**4360 ITEMS IN STOCK**

Harper is known as "Headquarters for Non-Ferrous and Stainless Fastenings" .... carries large and complete stocks of 4360 different items and is continually adding others ....maintains large stocks of metal in bars, rods, wire, sheet and other basic forms from which special fastenings can be quickly made. Write for 1945 Catalog.

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# HARPER

EVERLASTING FASTENINGS

ARMY E NAVY

**BRASS • BRONZES • COPPER • MONEL • STAINLESS**

# MEN of INDUSTRY

W. D. KENNEDY

G. D. MOOMAW

**William D. Kennedy,** vice president and manager of Wright Aeronautical Corp.'s Cincinnati, O. plant, has been named vice president and general manager of the corporation with headquarters at Paterson, N. J. Mr. Kennedy, who joined Wright Aeronautical in 1928, succeeds **P. B. Taylor,** who has resigned as vice president and acting general manager.

—o—

**Floyd Rose** has resigned as president, Vanadium-Alloys Steel Co., Latrobe, Pa., and has been succeeded by **Roy C. McKenna,** who will serve as both president and chairman. **R. B. George** was elected sales vice president; **L. D. Bowman,** production vice president, and **F. P. Underwood,** vice president and secretary. **J. P. Gill,** vice president, was appointed chairman of a newly formed executive committee which includes **Messrs. Underwood, George, Bowman** and **Alexander Nimick. J. Cleveland McKenna** was elected a director to fill the unexpired term of Mr. Rose.

—o—

**William J. Carroll** has returned as president to Carroll-McCreary Co. Inc., Brooklyn, N. Y., after serving as a lieutenant commander with the U. S. Navy.

—o—

**William L. Davis** has been elected vice president in charge of operations, United States Steel Supply Co., Chicago. Mr. Davis has been associated with U. S. Steel subsidiaries for the past 40 years.

—o—

**Tom M. Girdler,** chairman, Republic Steel Corp., Cleveland; **Robert I. Ingalls Jr.,** president, Ingalls Iron Works Co., Birmingham; **Charles J. Haines,** president, National Cylinder Gas Co., Chicago, have been elected members of the board of directors, Girdler Corp., Louisville, Ky.

—o—

**James H. Smith,** general manager of the Saginaw, Mich., Malleable Iron Division, General Motors Corp., Detroit, has been named a member of the staff of **W. C. Williams Jr.,** General Motors vice president and group executive in charge of Accessories Division. **B. A. Dollens,** manager of battery operations, Delco Remy Division, Anderson, Ind., succeeds Mr. Smith as head of Saginaw Malleable.

—o—

**Calvin Verity,** formerly vice chairman and treasurer and a member of the board of directors, Rustless Iron & Steel Corp., Baltimore, has been elected president succeeding **Charles R. Hook,** who was both chairman and president. **W. W. Sebald** was elected first vice president, a new office in the company. **G. D. Moomaw,** formerly vice president in charge of operations and a director, was elected vice president and general manager. He succeeds **C. L. Kingsbury,** resigned. **George W. Clearwater,** assistant treasurer, was elected treasurer.

—o—

**Conrad A. Goldstrohm** has returned to American Chain Division, American Chain & Cable Co. Inc., Bridgeport, Conn., after serving as chief, Chain Section, Tools Division, War Production Board, Washington. He will make his headquarters at York, Pa.

—o—

**Irving J. Johnston,** research engineer, Hibbing, Minn., has been named concentration engineer, Oliver Iron Mining Co.'s research laboratory, West Duluth, Minn.

—o—

**George D. Wilson,** associated with Latrobe Electric Steel Co. in the Detroit area for 13 years, has been appointed manager of the Detroit district office, Howell Electric Motors Co., Howell, Mich.

—o—

**Wallace J. Habermas** has been named manager of the automotive section, Detroit district, Industrial Products Sales Division, B. F. Goodrich Co., Akron, O. **A. D. Eastman,** formerly manager of office and technical personnel, Salary Personnel Division, has been named director of personnel service, succeeding **C. V. Molesworth,** resigned. **Earl R. Kambrich,** formerly in the Dayton, O., office has been transferred to the Los Angeles district as a sales representative. He is succeeded by **John W. Oakes,** who has been a member of the new products department with headquarters in Akron. **R. L. Custer** has been transferred to industrial products sales.

—o—

**David F. Beard** has been named manager of advertising and public relations, Aluminum Division, Reynolds Metals Co., Louisville, Ky. **Donald G. Dunn** has been appointed manager of marketing research.

—o—

**Henry G. Schmidt,** chairman of the board, North American Coal Corp., Cleveland, was elected president and chief executive officer. **O. C. Larsen** resigned as president.

—o—

**T. A. Ives** has been appointed fleet engineer, Pittsburgh Steamship Co., Cleveland, succeeding the late **Earl Rattray.**

—o—

**Verne R. Martin** has been appointed general sales manager, Maytag Co., Newton, Iowa. Associated with the company 20 years, he recently had been assistant manager, Kansas City branch.

—o—

**Dr. William E. Wickenden,** president, Case School of Applied Science, Cleveland, was elected president, American Institute of Electrical Engineers, New York. **S. H. Mortensen,** chief electrical engineer, Allis-Chalmers Mfg. Co., Milwaukee, was awarded the institute's Lamme medal.

—o—

**Lester H. Roemer,** assistant sales manager, R. K. LeBlond Machine Tool Co., Cincinnati, recently was named New York district manager for that company.

—o—

**Gerard F. Norton** has been named general manager of the engineering department, Crawford, Callan & Co., New York, import and export merchants. Mr. Norton will handle the export of machinery and industrial equipment to all foreign markets.

—o—

**J. W. Ashby** has returned to the Columbus, O., plant, Surface Combustion Corp., Toledo, O., as manager of application engineering. Mr. Ashby has been serving as Pacific Coast manager of engineering, Janitrol Aircraft Division. Also returning to Columbus from Los Angeles is **G. P. Mandel. Burton M. Sharpe** replaces Mr. Mandel as aircraft application engineer on the West Coast.

—o—

**A. W. Fraser,** Chicago district manager, Worthington Pump & Machinery Corp., Harrison, N. J., has been appointed war damage inspector and general European manager for the company, with headquarters in Paris. Mr. Fraser will be succeeded as Chicago district manager by **W. C. Chalk,** who has been as-

sistant district manager for the past eight years. **J. B. Laramy,** a member of the Chicago executive staff, has been named assistant district manager.

—o—

**R. C. Cosgrove,** vice president and general manager, Manufacturing Division, Crosley Corp., Cincinnati, O., has been re-elected president, Radio Manufacturers' Association for the coming year.

—o—

**O. R. Pendy** has been promoted to assistant chief mechanical officer with headquarters at Cleveland, for the New York, Chicago & St. Louis Railroad. Mr. Pendy formerly was general roundhouse foreman at Conneaut, O.

—o—

**Harold E. Piggott,** formerly in charge of purchases, has been promoted to assistant sales manager, Dockson Corp., Detroit. **Vincent D. Tappero,** plant manager, has assumed the additional duties of director of purchases; **Robert Nelson,** formerly general shop foreman, has been promoted to production manager.

—o—

**L. T. Dalecke,** assistant director of Fisher Body's aircraft section and former resident manager of its Cleveland bomber plant, has been named general factory manager of Fisher Body assembly plants. **H. D. Burnside,** general factory manager, Fisher Body's B-25 and B-17 bomber programs, succeeds Mr. Dalecke as assistant director of the aircraft section under **George C. Paterson,** general manufacturing manager.

—o—

Pennsylvania Salt Mfg. Co., Philadelphia, has added the following to its research and development staff: **Dr. C. E. Inman,** formerly with Hooker Electrochemical Co., Niagara Falls, N. Y.; **H. S. Fisher,** of Aluminum Co. of America, Pittsburgh; **O. T. Aepli,** Attapulgus Clay Co., Philadelphia, and **E. P. Street,** a recent graduate of Yale University.

—o—

**Thomas J. Bannan,** president, Western Gear Works, Seattle and Los Angeles, and its associate, Pacific Gear & Tool Works, San Francisco, recently was elected vice president, American Gear Manufacturers' Association, Wilkinsburg, Pa.

—o—

**David S. Hammerman,** executive vice president, Detecto Scales Inc., Brooklyn, N. Y., recently was elected a director.

—o—

**Col. T. B. Holliday,** has been appointed chief, Engineering Division's equipment laboratory, Army Air Forces, Wright Field, Dayton, O. He succeeds **Col. S. R. Stewart.**

—o—

**F. L. Alexander** has been appointed assistant national director, Kelite Products, Inc., Los Angeles, to supervise the company's new plant in Dallas, Texas, as well as all regional offices in the Southwestern Division. Other appointments include: **Earl Lester,** divisional manager

DAN BECK

R. R. STRATTON

in charge of all service engineers in the Southwestern Division; **Roy South,** plant superintendent; and **F. J. Oxspring,** plant foreman.

—o—

**Dan Beck,** for the past 14 years an executive with Dodge Division, Chrysler Corp., Detroit, has opened offices in Detroit to operate the Executives Selection & Training Institute. The service is designed to supplement hiring and promoting procedures of business and industry.

—o—

**T. Verhoef** has been appointed Seattle manager, Broderick & Bascom Rope Co., St. Louis, succeeding **E. B. Drisko,** resigned. Mr. Verhoef has been with the organization 18 years and has been in charge of operations the past eight years.

—o—

**Arthur H. Suckow,** chief metallurgist, Symington-Gould Corp., Rochester, N. Y., has been elected chairman of the Western New York Chapter, American Foundrymen's Association, Chicago. Other officers elected are: **Henry C. Winte,** vice chairman; **Martin W. Pohlman,** treasurer and **Leo A. Merryman,** secretary.

—o—

**Donald S. Russell** recently was named director of contracts, Bell Aircraft Corp., Buffalo.

—o—

**J. P. Skehan** has been promoted to assistant sales manager for sheet and Vuepak materials, Monsanto Chemical Co.'s Plastics Division, with headquarters at Springfield, Mass. He succeeds **S. A. Bell** who resigned to join Columbia Protektosite Co., Carlstadt, N. J.

—o—

**John F. Collyer,** president, B. F. Goodrich Co., Akron, O., has been named a member of the executive committee, International Chamber of Commerce.

—o—

Milwaukee Association of Purchasing Agents at its recent annual meeting elected the following officers: **Lyall C. Stilp,** Kimberly-Clark Corp., Neenah, Wis., president; **Edward L. Block,** Unit Drop Forge Division, Fuller Mfg. Co., Milwaukee, vice president; **Fred Syburg,** Chain Belt Co., Milwaukee, secretary; **Clifford H. Dawley,** Ampco Metal Inc., Milwaukee, treasurer. Directors: **Ray W. Brick,** Carnation Co., Oconomowoc, Wis.; **E. L. Janke,** Joseph T. Ryerson & Son Inc., Milwaukee; **J. M. Hamilton,** Dumore Co., Racine, Wis.; **Howell W. Pritchard,** Kearney-Trecker Products Corp., Milwaukee; **N. A. Schowalter,** West Bend Aluminum Co., West Bend, Wis.

—o—

**R. R. Stratton** has become sales manager, Davies Can Co., Cleveland, resigning as district manager, Smaller War Plants Corp. Before entering government service three years ago, Mr. Stratton served Ford Motor Co. in several executive positions.

—o—

**William B. McGorum** recently was named district sales manager, New York sales district, ACF-Brill Motors Co.

—o—

**Robert M. Honegger** has been named general manager of the Farrel-Birmingham Co.'s gear plant, Buffalo. He succeeds **Lester D. Chirgwin,** who, in March, 1945, was elected vice president in charge of manufacturing in the four Farrel-Birmingham plants.

—o—

**Clarence W. Newman,** director of research, Virginia State Chamber of Commerce, Richmond, Va., has been appointed industrial analyst, Chesapeake & Ohio Railway, and will make his headquarters at Huntington, W. Va.

—o—

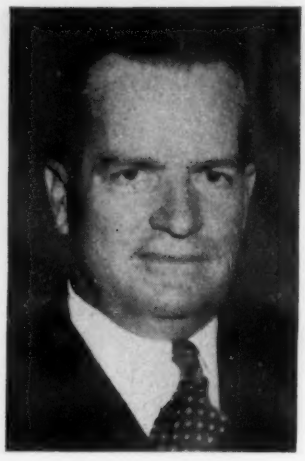
**D. C. Prescott** has been appointed to the sales staff, Baldwin Locomotive Works, Philadelphia, for the North Central district, with headquarters in Chicago. Mr. Prescott formerly was mechanical engineer at Omaha, Nebr., for the Union Pacific Railroad.

—o—

**Robert Gregg,** president, Tennessee Coal, Iron & Railroad Co., Birmingham; **Robert Strickland,** president, Trust Co. of Georgia, Atlanta; **Cecil Woods,** presi-

JOHN F. HUTSON

*Who was named Chicago district sales manager, Railway Sales Division, National Malleable & Steel Castings Co., Cleveland, as noted in STEEL, July 2, p. 78.*



S. RILEY WILLIAMS

*Who has been appointed director of international business, Worthington Pump & Machinery Corp., Harrison, N. J., as noted in STEEL, July 2, p. 77.*

G. S. CRANE

*Who has been elected president, Cutler-Hammer Inc., Milwaukee, succeeding F. R. Bacon, chairman of the board, as noted in STEEL, July 2, p. 76.*

dent, Volunteer Life Insurance Co., Chattanooga, Tenn.; and **George J. Pecaro,** plant manager at Meridian, Miss., Flintkote Co., New York, have been named trustees of the Southern Research Institute, Birmingham.

—o—

**Wilbur R. Manock,** secretary and treasurer, Horton Steel Works Ltd., Ft. Erie, Ont., Canada, has been elected president, succeeding the late **George Terry Horton.**

—o—

**Chauncey L. Baker,** for the past 20 years industrial relations manager, Lackawanna plant, Lackawanna, N. Y., of Bethlehem Steel Co., Bethlehem, Pa., is retiring. He is succeeded by **John E. Jacobs,** assistant to the general manager, who will also continue in that capacity.

—o—

**W. C. Snyder Jr.,** has resigned as vice president and director, Blaw-Knox Co., Pittsburgh, and as president, Lewis Foundry & Machine Division, Blaw-Knox Co., to accept the position of president and general manager, Continental Foundry & Machine Co., East Chicago, Ind. He succeeds **G. N. Herman** who has retired because of ill-health. **Frank E. Walling,** vice president, Lewis Foundry & Machine Division, has been acting manager of that company.

—o—

**Col. Nelson S. Talbott** has been named administrative assistant to the chief of engineering and procurement, Air Technical Service Command, Wright Field, Dayton, O., and **Col. Robert L. Finkenstaedt,** Chicago, has been named commanding officer of the newly-formed Central District, A. T. S. C., with headquarters in Chicago.

—o—

Electric Metal Makers Guild Inc. has elected the following officers for the coming year: President, **J. A. deBondy,** superintendent of melting, Manitoba Steel Foundries Ltd., Selkirk, Manitoba, Canada; vice president, **J. E. Arthur,** superintendent of melting, Crucible Steel Co. of America, Park works, Pittsburgh; and secretary-treasurer, **D. L. Clark,** superintendent of melting, Simonds Saw & Steel Co. at Lockport, N. Y.

—o—

**A. S. Knoizen,** Franklin, Pa., recently was elected a director, Reliance Electric & Engineering Co., Cleveland. He replaces **John D. Fackler,** who resigned as a member of the board but remains as legal counsel. Mr. Knoizen is executive vice president, Joy Mfg. Co., Franklin.

—o—

**James J. Mellon,** president, Clark Controller Co., Cleveland, has resigned to accept a confidential assignment with the United States government. **W. H. Williams,** former vice president, will serve as president until a successor is elected.

—o—

**P. D. Corkum,** superintendent at Racine, Wis., plant of Massey-Harris Co., since 1938, has been transferred to the company's Toronto, Ont., factory. **Robert Johnson** has been appointed superintendent, Tractor Division, and **Robert L. Benson** will succeed Mr. Johnson as superintendent of the tank plant.

## OBITUARIES . . .

**Donald L. McCubbin,** 55, manager of the Cincinnati steel service plant, Joseph T. Ryerson & Son Inc., died June 29 in that city. Mr. McCubbin had been associated with the company 30 years.

—o—

**B. G. Erskine,** 62, chairman of the board and former president, Sylvania Electric Products Inc., New York, died at his home at Emporium, Pa., recently.

—o—

**Max Spillman,** 64, a consulting engineer with the Centrifugal Pump Division, Worthington Pump & Machinery Co., Harrison, N. J., died recently at his home in Clifton, N. J. For his outstanding work in pump engineering, National Association of Manufacturers awarded him its Pioneer medal in 1940.

—o—

**John B. Strauch,** 75, St. Louis, died at his home in that city. Mr. Strauch served as president and later as chairman of the board, National Bearing Metals Corp. until the company became a division of American Brake Shoe Co.

—o—

**Roland R. Ware,** 61, president, Clarage Fan Co., Kalamazoo, Mich., died recently.

—o—

**Eugene A. McBride,** 57, plant manager, Thompson Products Inc., and its subsidiary, Thompson Aircraft Products Co., Cleveland, for 16 years, died June 28.

—o—

**William Walter,** 82, founder and former president, Walter Motor Truck Co., Ridgewood, Long Island, and a pioneer in the automobile industry, died recently at his home in New York.

—o—

**Raymond W. Towne,** 49, assistant secretary and first assistant to the vice president, Worthington Pump & Machinery Corp. at the company's Wellsville, N. Y. plant, died June 25.

—o—

**Benjamin Briscoe,** 78, automobile pioneer and former president, Maxwell-Briscoe Motor Co. which later became part of the Chrysler Corp., died June 22 at his home near Dunnellon, Fla.

—o—

**Frederick C. Renner,** 44, general manager of sales, Organic Chemicals Division, Monsanto Chemical Co., St. Louis, died June 26 in St. Louis.

# California Factory Employment Down 31 Per Cent from War Peak

***Number of workers drops 34,700 in May. Reduction largely due to order cutbacks in aircraft plants. Survey shows one out of every four laid-off workers in San Francisco area returning to postwar homes***

*SAN FRANCISCO*

FACTORY employment in California continues its downward trend. During May, production workers in durable and nondurable lines declined another 34,700 to a total of about 670,000 at the end of the month. Since the peak of employment in 1943, this represents a decline of 31 per cent.

Order cutbacks in aircraft plants were the biggest cause of the May reduction, that industry reporting a decline of 14,900 workers to a total of 141,200 on May 31. Since April, 1943, peak payrolls in aircraft manufacturing plants have been cut 103,500, or 42 per cent.

Private shipyards, which had a further decline of 3700 employes in May, now have 45 per cent fewer workers than at the peak. The heaviest reductions are still to come, however, within a month or two.

There are now 49,000 iron and steel workers in California, down 9000, or 18 per cent, from the wartime peak.

Although California's economic structure has not been upset by these steady reductions in employment, the state may begin to face a serious problem during the next six to 12 months.

In commenting on this prospect, Col. Alexander F. Heron, director of the State Reconstruction and Reemployment Commission, said:

"So far there has been no real distress due to unemployment. There are about 2200 persons drawing unemployment insurance in the San Francisco area, representing an increase of only about 530 during the last month. This indicates that we have a sponge situation. That is, workers as they drop out are so far by no means going into breadlines, but are being absorbed in many ways."

During the war, a large number of industrial facilities were established in the West, such as the new steel plants, aluminum and magnesium mills and several hundreds of fabricating factories of various kinds. All over the country similar expansion has occurred, of course. The postwar result will be that competition for markets will be much keener than in the past because of increase in the capacity to produce things the public uses.

One of the main pegs on which the West has been hanging its hopes for a postwar industrial economy (by using the war-built plants) has been the prospect that a large number of workers who migrated to the Coast during the war would live on in the West after the war. This resultant increase in permanent population, it was hoped, would form the basis for a sharply expanded market for things the West could produce in competition for the same things produced in the East.

Undoubtedly a certain proportion of the in-migrants will stay on after the war. But, on the basis of current trends, many more already are leaving than had been anticipated. Independent surveys show that in the San Francisco bay area about one out of every four laid-off workers has been going back home. When the families of these out-migrants are taken into consideration, that means much of the war-gained population already has been lost. As cutbacks increase the ratio of out-migration probably will increase.

## Kenworth Motor Truck To Build Plant at Renton, Wash.

Construction by Kenworth Motor Truck Corp. of the largest, most modern truck and bus manufacturing plant west of the Mississippi will begin immediately, Paul Pigott, president, announced in Seattle last week.

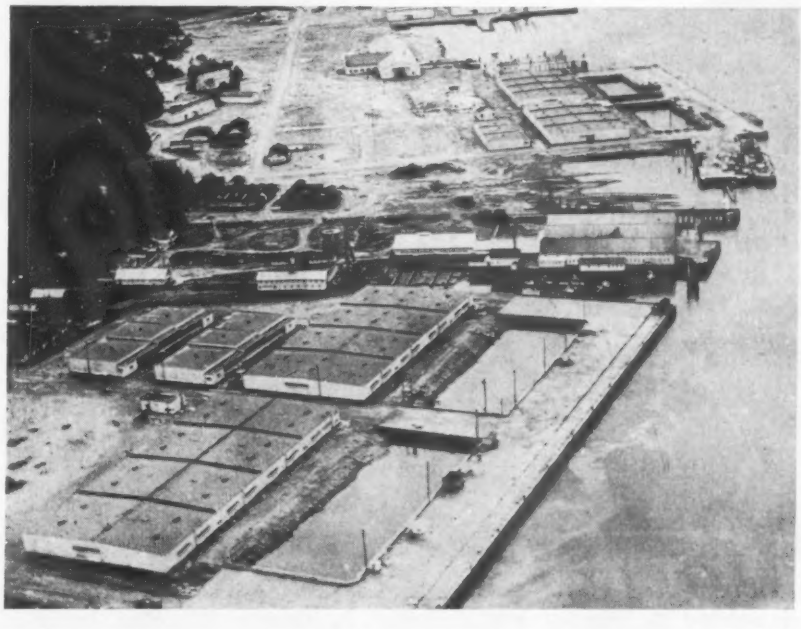
The factory will be built in Renton, Wash., on property owned by Pacific Car & Foundry Co. at an estimated cost of $250,000 to $300,000. It and other units will provide 200,000 square feet of floor area.

When the new plant is completed, Kenworth will move its operations from Seattle to Renton, where integrated production will be established in conjunction with the large, modern machine shop and foundry of Pacific Car & Foundry Co.

Kenworth operations will continue under the direction of John Holmstrom, general manager, and will employ the present personnel of Kenworth, together with the personnel of the body building shop at Pacific Car & Foundry Co.

In addition to the building in Renton, Kenworth is planning to establish a large factory distribution branch in downtown Seattle to handle service, parts and new truck sales.

In January of this year, Pacific Car & Foundry Co. acquired a controlling interest in Kenworth and new officers were named. In addition to Messrs. Pigott and Holmstrom, these include Ferdinand Schmitz, president and general manager of Everett Pacific Shipbuilding & Dry Dock Co., who was named a Kenworth vice president; Vernon A. Smith, who continued in his former position as vice president and sales manager; John Cannon, secretary-treasurer, now on military leave; Kenneth Worthington and F. D. Pittsburgh, assistant secretary-treasurer.



SECRET REVEALED: An $18 million secretly built Army port on isolated Excursion inlet, Alaska, and used only 11 months will be dismantled for salvage by 700 prisoners of war, first to be sent outside the U.S. NEA photo

# WING TIPS

***Technical advancements of war period will have profound influence in postwar aviation, particularly in jet propulsion, pilotless aircraft, rocket power and all-weather operations made possible by radar and micro-wave techniques***

DURING the years immediately ahead —and probably sooner than many think— aviation will be influenced profoundly by a series of technical developments rapidly advanced by the war. Among these are jet propulsion and the gas turbine, pilotless aircraft and guided missiles, rocket power, all-weather operations made possible by radar and microwave techniques and the practical development of helicopters.

This is the opinion of D. Roy Shoults, vice president of sales, Bell Aircraft Corp., Buffalo, expressed recently before the American Society of Mechanical Engineers at Chicago.

"To put the matter into perspective, it might be said that modern aircraft progress can be characterized as the conquest of the third and fourth dimensions; the third dimension, altitude, the fourth dimension, speed," said Mr. Shoults.

"Future progress in airplane development and utilization will be in connection with increases in speed, altitude performance and effective utilization of load carrying capacity and availability at high speeds, high altitudes or long ranges.

"To consider the first factor of speed as affecting future design, according to the Bell official, we would expect progress by:

"1. Increases of propulsive power per unit of weight or size of power plant or unit of fuel consumed.

"2. Increasing effectiveness of wing design, including various means of extending wing surfaces for assistance in landing or takeoff such as now provided by various flap designs.

"3. Cleaning up the airplane from an aerodynamic standpoint to reduce the parasitic drag to an absolute minimum by smoothing up surfaces, removing projections and eliminating configurations which cause air flow interference.

"Further progress in high speed flight leads one to the consideration of so-called critical speeds or discussions of mach numbers. Mach number is an expression of the ratio of velocity of air flow to the velocity of sound at a particular point. A mach number of 1.0 indicates that the air flow velocity is equal to the velocity of sound.

"For velocities at or near mach number 1.0, the air in front of an object moving in the atmosphere is compressed and subsequently flows around the object with considerable loss. This results in high drag and consequently extremely high values of power are required to produce such velocities," Mr. Shoults explained.

"As the speed of sound is proportional to the square root of the absolute temperature it is lower at high altitudes than at sea level and consequently compressibility and critical mach number difficulties are usually encountered first in flight in the frigid atmosphere at high altitude.

"Future research in high speed flight will most certainly emphasize methods of reducing the ill effects of compressibility. With propeller driven aircraft the vector velocity of the propeller tip in free air is considerably greater than the absolute speed of the aircraft through the air, consequently the propeller tip enters the compressibility range with consequent loss of propulsive efficiency before the rest of the structure suffers seriously from compressibility. This is one of the reasons that jet propelled power plants have been so effective in increasing the maximum speeds of today's fighter aircraft.

"Another characteristic of jet propulsion power plants favorable to high speed flight is that the power plant is essentially a constant thrust device rather than a constant horsepower one as is the conventional engine. As the speed of flight is increased the horsepower available from a given jet power plant increases substantially in proportion to aircraft speed and at speeds of 400-500 mph the jet propulsion plant produces more horsepower for a given space or weight than can conventional piston type engine driving propellers. As speeds increase above this range the effectiveness of the jet plant increases in proportion."

The Germans in their V-1 weapon have shown the possibility of utilization of unusual thermodynamic cycles for specific uses, and Mr. Shoults expressed confidence future developments will increase the utility of the resonant jet reaction engines. Such engines will undoubtedly be of greatest use for military purposes where cheapness and expendability are of greater importance than low specific fuel consumption and long life.

ACCURATE: A new measuring instrument having a precision never yet demanded by industry was described by Gerard M. Foley, research physicist of Battelle Memorial Institute, Columbus, O., before the Chicago section of the American Society of Mechanical Engineers. An unusual type of electrical micrometer, the instrument measures movements or changes in position as small as one-tenth millionth of an inch

### Rockets Excite Interest

"The rocket type power plants," he said, "after years of experimentation, are now exciting terrific interest as a result of the terrifying success that the Germans realized in their V-2 weapon.

"In the further development of private, commercial or military flying, in order to maintain the maximum utility of the service, progress must and will be made in 'all weather' operation."

Of first importance in this connection is the development of radio aids to permit the pilot to take off and land with assurance and safety under substantially zero-zero conditions. Developments of the micro-wave and radar techniques will, within a few years, permit complete blind flight including takeoffs and landings and will probably go further to the point of automatically con-

# this is important when you buy Cold-Rolled Stainless Sheets

All stainless steel cold-rolled sheets have much in common. They are rustless and they possess high strength. But frequently there is one important difference. It is in the *finish*.

The amount of cold reduction determines the quality of the surface. There are two methods of rolling—the handmill and the continuous mill.

**GREATER COLD REDUCTION**

The Armco-invented continuous process of rolling gives stainless sheets as much as *four times the amount of cold reduction* given sheets produced by the handmill process.

An ARMCO No. 2B Finish continuous process sheet, for example, is hot rolled down to .140 (10 gage) in wide coils hundreds of feet long. These are then reduced to .037 (20 gage) on continuous cold-reduction mills. This is about *74 per cent cold reduction.* On the old-fashioned handmill the sheet would normally be hot rolled to about .045, then cold reduced to .037. This is 18 per cent cold reduction.

**DRAWS WELL, LOOKS BETTER**

Cold-reduction by the continuous mill method produces a dense, fine-grain sheet which draws exceptionally well, looks more attractive and polishes easily. It has a beautiful appearance even when unpolished.

You'll be time and money ahead when you specify stainless sheets cold reduced on continuous mills. For more information on ARMCO No. 2B finish sheets, just address The American Rolling Mill Company, 2371 Curtis Street, Middletown, Ohio.

EXPORT: THE ARMCO INTERNATIONAL CORP.

*The American Rolling Mill Company*

**Special-Purpose Sheet Steels**

STAINLESS ARMCO STEEL

trolling the airplane during the landing under zero visibility conditions. Much standardization work will necessarily need to be done in this connection so that the aids used are at least nationwide and probably worldwide in availability.

As air speeds increase to the 400-500 mph category for normal commercial operation, Mr. Shoults said, radar aids will be doubly necessary even under good weather conditions for the visibility over or near most of our large cities is only a few miles by reason of the high smoke content in the atmosphere. The 500 mph aircraft must begin to slow down 25 to 30 miles before landing even if approaching at low altitude. Traffic control in airport regions will necessarily be improved to control the approach of such flights with minimized delays and adequate safety.

The other major factor in "all weather" flying is the problem of ice accumulation on the aircraft.

Commercial aircraft transports have been and will be developed to almost any maximum size that the traffic will justify. It is believed that there is no fundamental design limitations which would prevent the successful construction of a million pound aircraft. In recent years aircraft weights have doubled from 30,000 to 60,000 pounds and doubled again to the 1/8th million pound size as exemplified by the B-29 and are now being again doubled to ¼-million pounds gross weight in commercial aircraft as recently announced.

## New Aircraft Electrical System Provides Greater Power, Saving in Weight and Wire

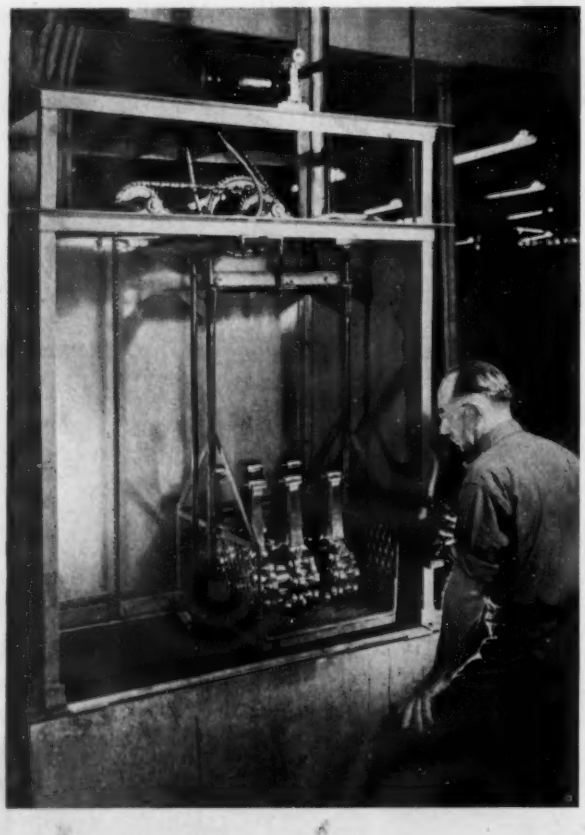
TWICE the electrical power of the B-29 with 20 per cent less weight of motors and a saving of more than 2000 pounds in wire have been worked out in the electrical system of a newer and much larger airplane than the B-29, by Col. T. B. Holliday, AAF engineer at Wright Field, O., who recently was appointed chief of the engineering division's equipment laboratory there. Secret of the development, according to information from the Air Technical Service Command, is a change to 400-cycle high-frequency alternating current, permitting a reduction in the amount of "iron" needed for a given horsepower.

Colonel Holliday has pioneered the use of electric motors to drive aircraft accessories. He established specifications by which weight of motors, generators and wire was reduced importantly, making possible the operation of generators at high altitudes. Number of electric motors in a pursuit plane has been increased from none to 11, while more than 140 have been installed in the large bombers. Output of generators has been increased by 1600 per cent.

It is not entirely clear what the "newer and larger plane than the B-29" is, but it is possibly a reference to the B-36, ultralong-range bomber designed by Consolidated Vultee and in the planning stage since early in the war. Peacetime version of this huge ship doubtless is the Consolidated Model 37 transport, pictures of which have been released, with announcement it would be furnished to Pan-American Airways after the war. As now drawn up, it is a six-engine, 204-passenger transport with speed of 300-400 miles per hour, and twelve times larger than the DC-3 airline transports now in use.

In a military version, the six pusher-type engines conceivably could develop something like 18,000 combined horsepower, and sufficient gasoline might be carried to provide close to 10,000-mile operating range. Although no announcement has been made, it is considered possible at least the military model shortly will be ready for testing, particularly in view of the fact many of the specifications of the Model 37 are stated to be "restricted by military necessity."

Latest news flash from Consolidated on the Model 37 relates to the possible use of helium gas instead of air in the giant tires on the liner. Air required to fill the tires would weigh 180 pounds, against 26 pounds of helium. Further the company has computed the 160-ton plane will weigh 745 pounds less at 25,000 feet altitude because of the diminished pull of gravity.



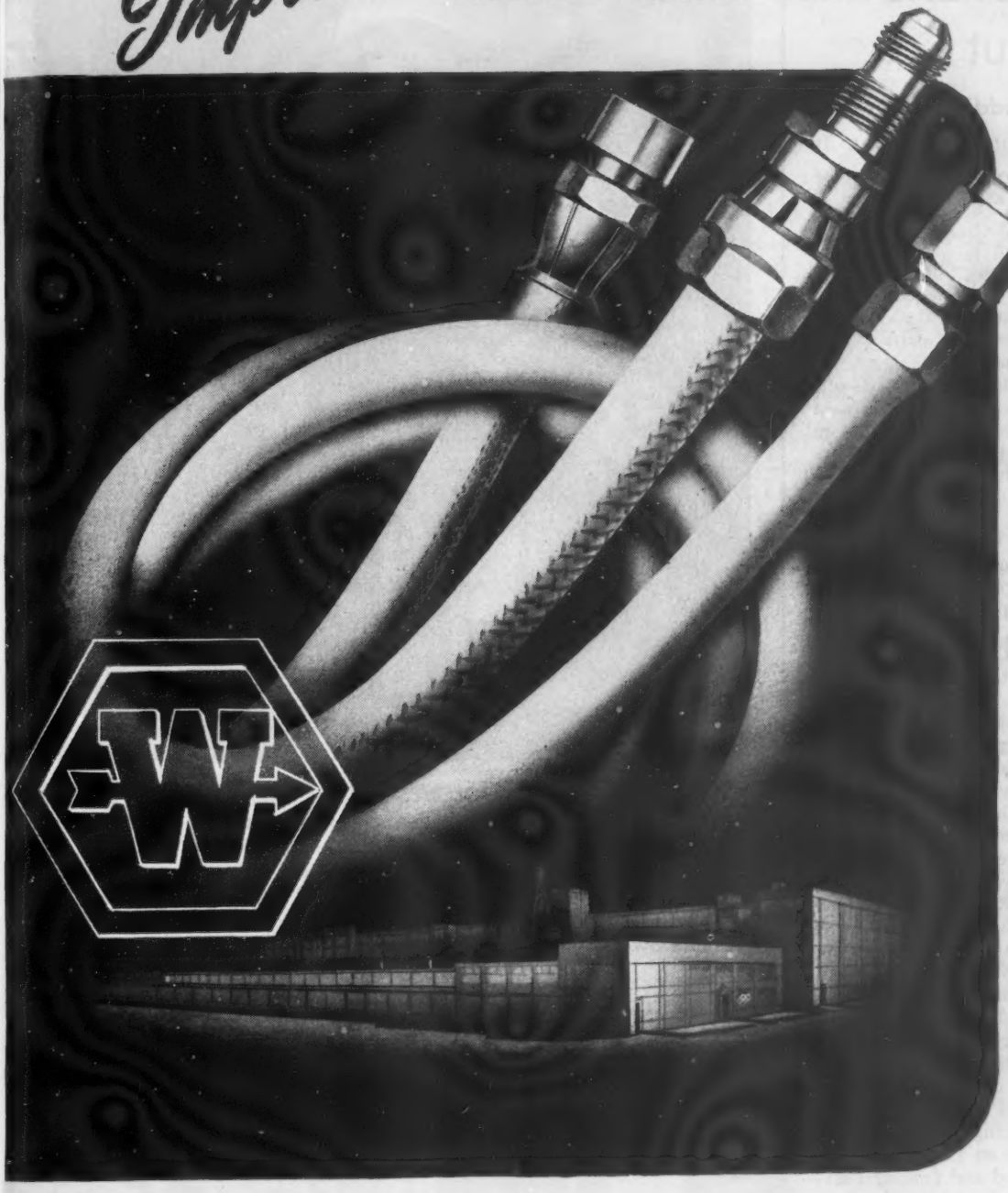
SPEED DEGREASING: Master or "banjo" connecting rods for Pratt & Whitney aviation engines in basket of dual degreasing elevator devised by engineers of the Buffalo plant of Chevrolet Motor Division of General Motors Corp. to facilitate handling and control rate of travel through degreasing vapors

## Wright Aeronautical To Release Educational Film

"Power House of Aviation," a new educational film produced around the Wright Cyclone 18 aircraft engine, will be released soon for showing to appropriate groups throughout the country. Starting with a brief review of the history of the Wright Aeronautical Corp. the picture takes the audience on a personally conducted tour through the plants, and shows how the most modern, high-production machine tools and processes have been sucessfully applied to the ultra-precision work demanded by these engines. In contrast with these new methods, some of the earlier processes are shown to enable the audience to appreciate the advances made in manufacturing methods during the war years.

Methods of producing both the cast and forged cylinder heads, as well as numerous other parts, are shown in some detail, together with the various steps of assembly, inspection, and test. The closing scenes show Cyclones in action on all the different fronts, installed in such famous fighting ships as the Boeing Fortress and Superfortress, in the Martin Mars, the Lockheed Constellation, and other planes of the Army Air Forces.

# *Improved* INDUSTRIAL HOSE LINES



In addition to industrial hose, Weatherhead plants make all types of fittings, valves, hydraulic cylinders and other parts for these industries

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# Barium Acquires Control of Erie Bolt & Nut Co.

***Purchase is additional step in Barium's program to widen its activities in correlated lines of production***

BARIUM Steel Corp., Canton, O., has acquired control of the Erie Bolt & Nut Co., Erie, Pa., through the former's wholly owned subsidiary, Clyde Iron Works Inc., Duluth.

Acquisition of Erie Bolt & Nut Co. is another step in the postwar program of Barium Steel to broaden its activities in correlated lines of production. Negotiations are pending for further expansion through acquisition or merger with other companies.

Erie Bolt & Nut Co. is a supplier of special alloy bolts, studs, and related products to manufacturers of railroad and farm equipment, airplane producers, construction companies, gasoline plants, machinery, rubber, and other businesses. Its present management and personnel will be retained.

The Erie company is operating at capacity. While a large part of its activity is presently devoted to supplying demands of the Army and Navy its machinery and operating facilities require no reconversion or interruption for manufacture of peacetime products. Through the Barium and Clyde organizations the demand on Erie Bolt & Nut will be augmented considerably. The Clyde Iron Works Inc., full control of which was obtained by Barium Steel last September, is one of the principal producers of whirleys, hoists, and similar machinery, with agencies in foreign countries as well as in the leading cities of America.

With acquisition of Erie Bolt & Nut Co. the Barium Steel Corp. now operates three plants producing important steel products. The Barium forging plant at Canton has originated and produced several die and piston rod steels and last year expanded facilities by purchase and lease of additional equipment. Clyde Iron Works Inc. produces equipment for industrial, contracting, railroad, oil and mining, logging and naval lines.

## Jorgensen Co. Constructs Additional Steel Warehouse

Earle M. Jorgensen Co., steel distributor, has completed foundations for an additional warehouse, its fourth in Los Angeles. The new structure, 80 x 300 feet, will be devoted exclusively to handling plates and is designed especially for that purpose.

***"INSULATING" WELDING GLOVES:*** *Novel safety device at Graham-Paige Motors Corp., Detroit,* **is this mitt-dryer designed to protect employes welding amphibian tanks. Perspiration, with its high salt content, is a good conductor of electricity and increases the danger of serious shock to workers handling electrical equipment. To eliminate the hazard, welding gloves now are dried rapidly by slipping them over narrow chimneys protruding from a metal cabinet which contains a heater and fan**

# BRIEFS . . . .

***Paragraph mentions of developments of interest and significance within the metalworking industry***

**Allegheny Ludlum Steel Corp.,** Brackenridge, Pa., has issued its first news letter that will be sent quarterly to stockholders.

—o—

**Pullman-Standard Car Mfg. Co.,** Chicago, announced that the Distinguished Service to Safety award of the National Safety Council has been won for all of its 12 plants.

—o—

**Society of Automotive Engineers Inc.,** 29 West 39th Street, New York 18, is distributing its 1945 handbook.

—o—

**Thomas Machine Mfg. Co.,** Pittsburgh, has appointed the following as sales agencies: Northern Machinery & Supply Co., Minneapolis; Richard Ives Co., Denver; J. M. Grisley, Salt Lake City, Utah; Dawson Machinery Co., Seattle; Harron, Rickard & McCone Co., San Francisco and Los Angeles; C. J. Harter Machinery Co., Houston and Dallas, Tex.; Robert R. Stephens Machinery Co., St. Louis; George E. Zweifel & Co., Portland, Oreg.; Bryant Machinery & Engineering Co., Milwaukee; and Noland Co., Nashville, Tenn.

—o—

**General Motors Corp.'s Electro-Motive Division,** LaGrange, Ill., has leased 126,000 square feet of the Defense Plant Corp.'s aluminum sheet plant at McCook,

Ill., and will use it for fabricating operations.

—o—

**Wilson Welder & Metals Co. Inc.,** New York, has appointed Graybar Electric Co. exclusive distributor of Wilson electrodes in areas served by Graybar's Cincinnati, Cleveland and Pittsburgh offices.

—o—

**Baltimore & Ohio Railroad** has applied to the U. S. Corps of Engineers for permission to construct coal and ore docks, piers and bulkheads and for dredging on the south shore of Maumee Bay, Lake Erie, O., outside and east of Toledo, and outside and west of Harbor View, O.

—o—

**Baldwin Locomotive Works,** Philadelphia, will open a headquarters in Paris in September to provide coverage for Baldwin's heavy machinery in France and its colonies, Belgium, and Holland. Thomas Butts will direct the office.

—o—

**H. K. Porter Co. Inc.,** Pittsburgh, has moved its Rochester, N. Y., offices to Buffalo. W. A. Coyle, former assistant combustion engineer with Republic Steel Corp. at Buffalo, will be district manager for the Porter company.

—o—

**Sprague Electric Co.,** North Adams, Mass., has received the Air Technical Command's Approved Quality Control rating indicating the firm's inspection organization can be entrusted with full responsibility in assuring that products meet all requirements of the Army Air Forces.

—o—

**Ekco Products Co.,** Chicago, has purchased a five-story building at 31 Madison Avenue, New York, and will remodel it to provide show rooms and offices for Ekco executives in the latter city.

—o—

**Robert H. Clark Co.,** 9330 Santa Monica Boulevard, Beverly Hills, Calif., will build an addition to its plant to provide for an increase in production of cutting tools and tool holders. A new catalog of the company's products is now available.

—o—

**Sterling Engine Co.,** Buffalo, has received orders for $2 million worth of diesel engines to drive electrical generating plants in rehabilitation work abroad and to propel diesel-electric cars for western railroads.

—o—

**Central States Steel Inc.,** Kansas City, Mo., has leased a warehouse at 637 Schmidt Road, Davenport, Iowa, where the company will open a wholesale warehouse for steel and wire products.

—o—

**Nox-Rust Corp.,** Chicago, has opened the following new sales offices: Buffalo, 1200 Niagara Street, with C. R. Craig in charge; Philadelphia, Meadow & Wolf Streets, with L. J. LaBarge of Commercial Warehouse Co. in charge; Waterbury, Conn., 531 Bank Street, with G. R. Angrave in charge; and Cleveland, 14511 Woodworth Avenue, with T. C. White in charge.

—o—

**Westinghouse Electric Corp.,** Pittsburgh, has presented to Arthur E. Marsh, Madison, N. J., $3063, highest award the firm ever made under its suggestion system. Mr. March's suggestion reduced by 62 per cent the quantity of gold alloy wire needed to solder electronic tube parts.

—o—

**Gray Foundry Inc.,** Poultney, Vt., has taken over the American Pipe Bending Machine Co. Inc., Boston, and entire operations will be conducted from Poultney.

—o—

**Pipe Machinery Co.,** Cleveland, announced that Homer B. "Tex" Johnson, 549 West Washington Boulevard, Chicago, will represent it exclusively in the Chicago-Milwaukee area.

—o—

**Fowler Mfg. Co.** is located in its new factory, 2545 S. E. Gladstone Street, Portland 2, Oreg.

## ASTM Names Bell Telephone Engineer as New President

New officers have been chosen for the American Society for Testing Materials, Philadelphia.

President is J. R. Townsend, materials engineer, Bell Telephone Laboratories Inc., New York, and vice president is T. A. Boyd, head of the fuel department, Research Laboratories Division, General Motors Corp., Detroit. Members of the executive committee are: John R. Freeman Jr., technical manager, American Brass Co., Waterbury, Conn.; L. J. Markwardt, assistant director, U. S. Forest Products Laboratory, Madison, Wis.; Carlton H. Rose, chemist, National Lead Co., Research Laboratories, Brooklyn, N. Y.; L. P. Spalding, chief research engineer, North American Aviation Inc., Inglewood, Calif.; and William A. Zinzow, chief physicist, Bakelite Corp., Bloomfield, N. J.

## Las Vegas Plant Expects Increase in Production

The Pneumatic Tool Division of Steel Conversion Corp., Las Vegas, Nev., is producing more than 800 units a day and in the next three months the output will rise to about 2400 units daily.

Facilities are also avialable now at the Las Vegas plant for general repair of custom industrial tools. G. A. Duemling, president, said a larger building will be built soon on the company's property, and by the end of the year the company will be employing more than 200 men. Mr. Duemling contemplates establishing other plants to give the West complete service on custom tools.

Steel Conversion Corp. is not affiliated with the Steel Conversion & Supply Co., Pittsburgh, but is using the same patents and processes.

HONORED: Dr. Charles E. Skinner, center, founder of Westinghouse Electric Corp.'s research laboratories, Pittsburgh, was honored on his eightieth birthday. Discussing research advances with him are F. D. Newbury, left, Westinghouse vice president, and Dr. L. W. Chubb, laboratories director

# How the Hercules Powder Co. PURCHASES STAINLESS

*Development of Satisfactory Working Specifications and tests for steels for use in chemical processing are described*

By W. L. HEWES
*Assistant Director of Purchases*
Hercules Powder Co. Inc.
Wilmington, Del.

OUR experiences in the purchase of the so-called stainless steels stem from a short terse set of specifications which over the years has evolved into the following:

**Weak Mixed Acid Corrosion Test:** "This material shall passivate, with a total loss not exceeding 0.25 grams per square inch when tested in boiling weak mixed acid, in accordance with Hercules Powder Co. Method C-38-2."

**Boiling 65 Per Cent Nitric Acid Test:** "Nonaustenitic materials (similar to Types 430, 442, and 445) shall have a corrosion rate not greater than 0.075-in. per year and austenitic materials (similar to Types 304, 316, 317, 347) not greater than 0.040-in. per year, when tested in boiling 65 per cent nitric acid in accordance with Hercules Powder Co. Method C-38-1."

The demand in these short specifications makes clear the conditions under which the material is to operate and leaves nothing to luck or chance, nor do they demand the ultimate of skill and dexterity in checking them. The resultant experiences in meeting these specifications have not been cloaked in heroics. Our requests for high quality under these conditions have been met with calm judgment, co-operative effort and careful study of changing operating conditions. The result is a consistent improvement in materials, as shown on our test report cards, a few of which are exhibited in Tables I and II.

We are obtaining with less frequency, poor tests as shown in Table III.

We do not reject material on first test but subject it to a second and occasionally a third test. If the final results confirm the first test, even then the material is not immediately rejected but the plant demands are scanned very carefully to find a place for the material where the corrosive conditions are less severe than that for which the material was purchased.

The above tests are reported here merely to indicate the wide field of material used.

All our orders for alloy material for critical corrosive conditions are purchased under specifications which both mills and warehouses have shown an anxiety to meet. The conditions have been met firmly and successfully without the fanfare of advertisement.

However, from a purchasing viewpoint, the recent advertising of the chemical industry is a challenge to the steel industry to display to the purchasing and consuming public what is undoubtedly going on quietly behind the scenes in the development of improved steels sought by the chemical industry for production. Many of these improved chemical production processes were heretofore thought to be impossible or limited in use because of the lack of advanced types of steels to limit the corrosive actions of the new chemical products.

**Early in the History** of alloy production, steel mills were handicapped by the tonnage principle so long prevailing in the industry. It was difficult for a steel

(*Please turn to Page* 134)

*Fig.* 1—*One of eight KA* 2 *SMO Type* 316 *stainless steel tanks* 96 *in. outside diameter,* 11 *ft* 7⅜ *in. high and* ½*-in. thick fabricated by Edge Moor Iron Works, Wilmington, Del.*

*Fig.* 2—*Here one of* 20 *Type* 430 *stainless steel tanks is being fabricated by Edge Moor Iron Works. Tank is* 96 *in. outside diameter,* 25 *ft long, with walls* ⅜*-in. thick. As this material requires unusual care to prevent cracks, it was annealed at* 1425°*F and furnace cooled*

*Fig.* 3—*Three sections and top cap of a Type* 430 *stainless steel tower made from* ⅝*-in. thick stock. Each section is* 13 *ft long,* 64 *in. in diameter. Fabricated by Downington Iron Works, Downington, Pa.*

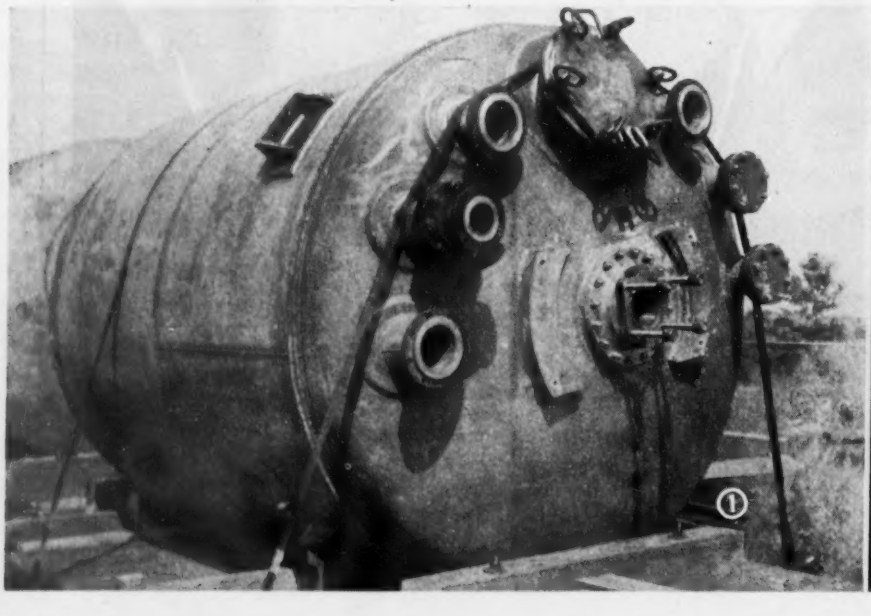


*Fig. 4—Closeup of a riveted section of one of the units in Fig. 3. These two views are regarded as good examples of riveted work in stainless steel*

**TABLE I—WEAK MIXED ACID CORROSION TEST**

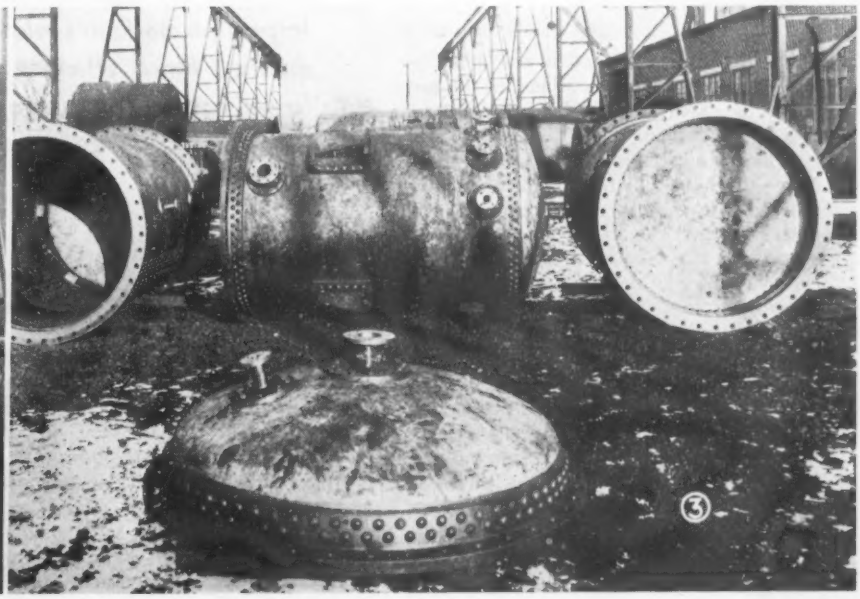
| Material | Total Weight Loss Hours Boil 2 | 4 | 8 | 12 | Penetration After 12 Hours (Inch) |
|---|---|---|---|---|---|
| 12 Sheets 24 ga. 36 x 91" Type 316 Ka2SMO No. 1 white finish (For general plant use) | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.00000 |
| 9#—1 Pc. 1-⅛" Chrome Tubing 18-8 Type 302 (For compressor room) | 0.0008 | 0.0008 | 0.0011 | 0.0020 | 0.00002 |
| 4—6" Ka2SMO Gate Valves (For boiling tub house) | 0.0002 | 0.0002 | 0.0005 | 0.0005 | 0.00001 |
| 50 lbs. 3/32" dia. chrome Electrodes (For general plant use) | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.00000 |
| 50—⅜" x 1⅛" Rd. Hd. Rivets Type 304 18-8% Chrome (For boiling tub house) | 0.0021 | 0.0021 | 0.0021 | 0.0028 | 0.00001 |
| 1 Bar 2¼" Dia. x 6' x 1" Lg. Ka2SMO, Type 316 Stainless Steel (For paddle arms—tub house) | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.00000 |
| 100 Pcs. ¾" x ¼" x 3/16" Stainless Steel Washers (For boiling tub house) | 0.0006 | 0.0006 | 0.0006 | 0.0006 | 0.00000 |

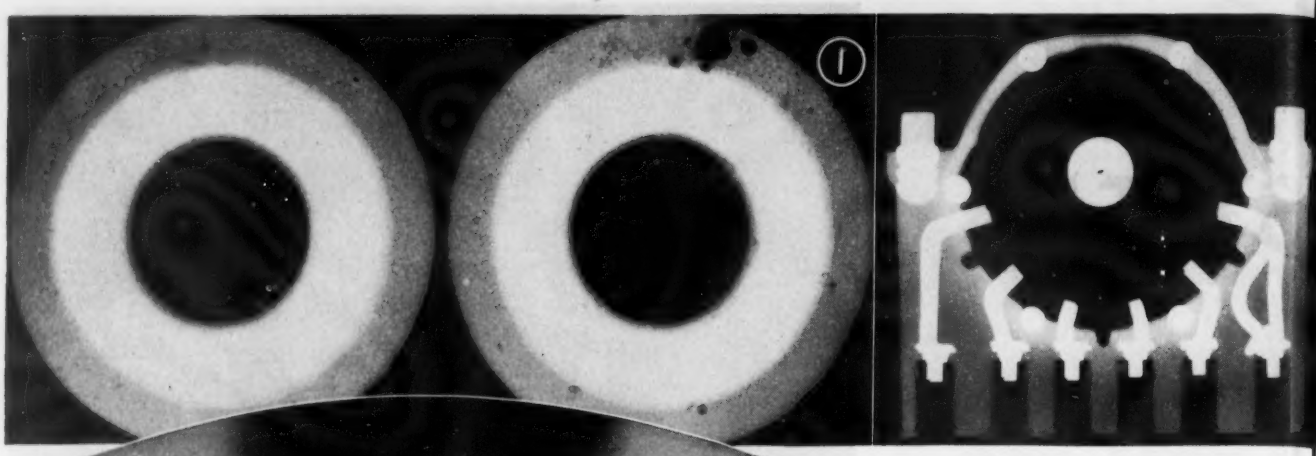
**TABLE II—STRAIGHT NITRIC ACID TEST**

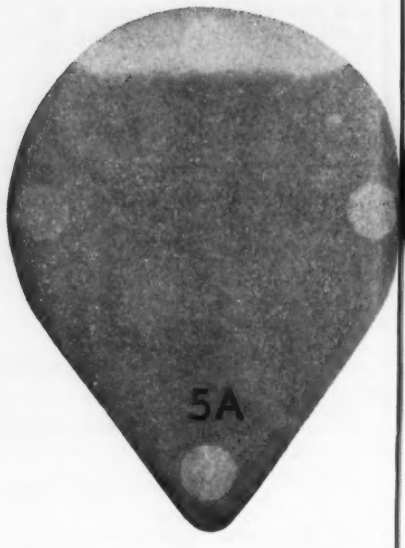
| Material | Inches Penetration Per Year According To First 12-Hour Boil | Second 12-Hour Boil | Third 12-Hour Boil |
|---|---|---|---|
| 4—1" No. 111 18-8 Chrome Flanged Gate Valves (For ammonia oxidation) | 0.044 | 0.048 | 0.036 |
| 64.76 lbs. (7 spools) Type 304 Stainless Steel Wire (For making carboy wires) | 0.0134 | 0.0284 | 0.0105 |
| 1—1" O.D. Type 430 Seamless Tubing (For acid plant) | 0.035 | 0.025 | 0.039 |

**TABLE III—WEAK MIXED ACID CORROSION TEST**
**(Sample of unsatisfactory test results)**

| Material | —Total Weight Loss Hours Boil— 2 | 4 | 8 | 12 | Penetration After 12 Hours (Inch) |
|---|---|---|---|---|---|
| 5 lbs.—3/16 x ⅜" Flat Head Rivets Type 430 Chrome (For nitrating area use) | 0.4336 | 0.4336 | 0.4336 | 0.7494 | 0.01215 |








# X-Ray in Postwar Era

***Inspection medium's relatively brief history replete with achievements. More efficient use of metals, fewer rejections, and lower costs through proper design make strong argument for X-ray expansion in next few years***

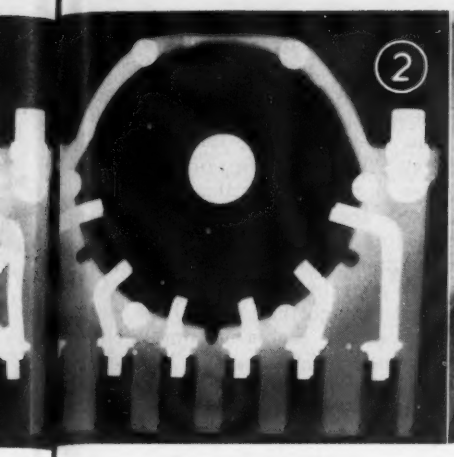
INCREASED knowledge and a growing realization of the usefulness of the potent force, X-ray, have taken all the mystery out of at least one aspect, and today industry is aware that it has a tool at its disposal which will tell "volumes" about otherwise hidden secrets of many products. Roentgen in 1895 could hardly have suspected that one day his laboratory achievement would be an accepted means of proving soundness of repairs to parts which would otherwise be scrapped, of developing casting techniques, determining proper pouring temperatures, eliminating excess metal through efficient design, proving accurate placement and bonding of inserts, or of performing any of a number of other important functions.

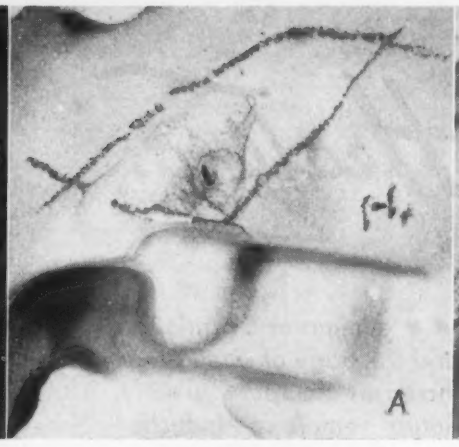
Use of X-ray as an inspection device, especially in connection with shell casings and loaded shells, has received wide publicity, but little has been written on its potentialities as a production tool in the all-important postwar era. It would seem that in this respect it will prove most valuable.

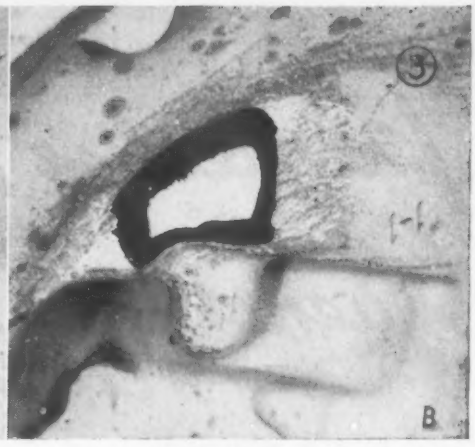
Importance of efficient and rapid war production has led to installation of X-ray equipment or radium in hundreds of plants, and management has been given an opportunity to observe at first hand how really effective X-rays can be in helping to turn out faultless products of war. Many of these same plants can be counted on to continue and expand their use of that equipment as an aid to the production of consumer goods.

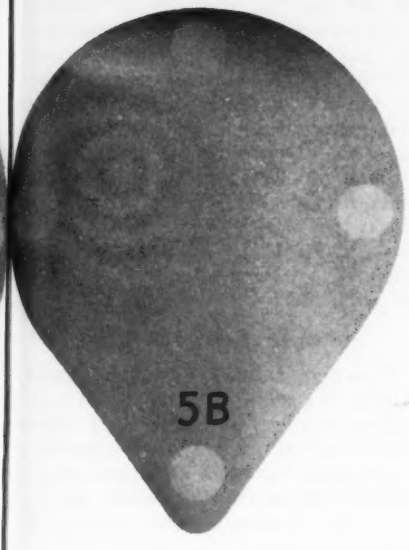
The Rochester, N. Y., plant of Delco Appliance, a division of General Motors, is one of many that have found X-ray a boon to production. Electrical appliances they make for aircraft and other war products must be right. Delco employs X-ray extensively as a development aid for new products in its own plant and for those of its suppliers, and as a constant accurate check on the quality of regular production.

Consider the case of an aircraft electrical appliance which required a new type



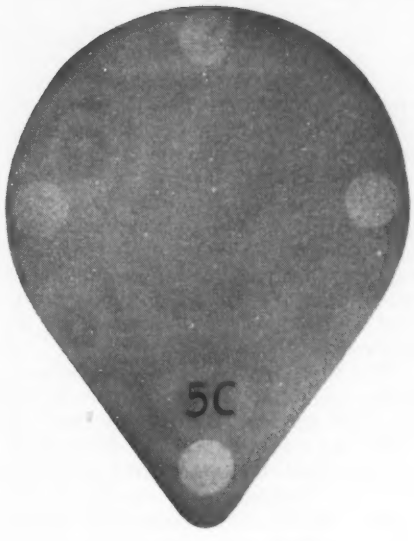



*Fig. 1—Radiographic inspection of this simple bearing housing revealed defects in sample at right. Blowholes and porosity have been eliminated in sample at left*

*Fig. 2—Imperfect distributor molding at left is distinguished easily from acceptable one on right by radiography. Badly bent insert in left-hand view could arc with adjoining insert, preventing proper functioning of distributor*

*Fig. 3—Closeups of typical flaw (before welding, left) in 40-lb casting of flywheel housing, and after welding, right, as shown radiographically*

*Fig. 4—Radiograph of defective cast aluminum housing which led to improved casting technique*

*Fig. 5—Four stages of improvement in castings following experiments to reduce grain size and porosity by controlling pouring temperature. Radiographs of exhibits a, b and c proved temperatures were too high. Sample 5d, accepted, was poured at 1250°F*

*Fig. 6—An early attempt at alloy steel supercharger diaphragm was X-rayed (left) and resulted in sound castings of type shown at right*

of housing. Plans called for a housing of cast aluminum containing several inserts in the form of bronze bearings, copper tubes, laminated soft iron field parts, and several brass strips. Blueprints for the housing were released to a foundry which developed what appeared to be a satisfactory technique and began delivery of castings to Delco, who radiographed them as a part of its standard procedure. Some of the initial lot were rejected for flaws. The foundry made changes in its technique and began delivery of improved castings, but some irregularities continued. Delco radiographed all castings received every day for a period of 3 weeks while the foundry continued to make changes suggested by

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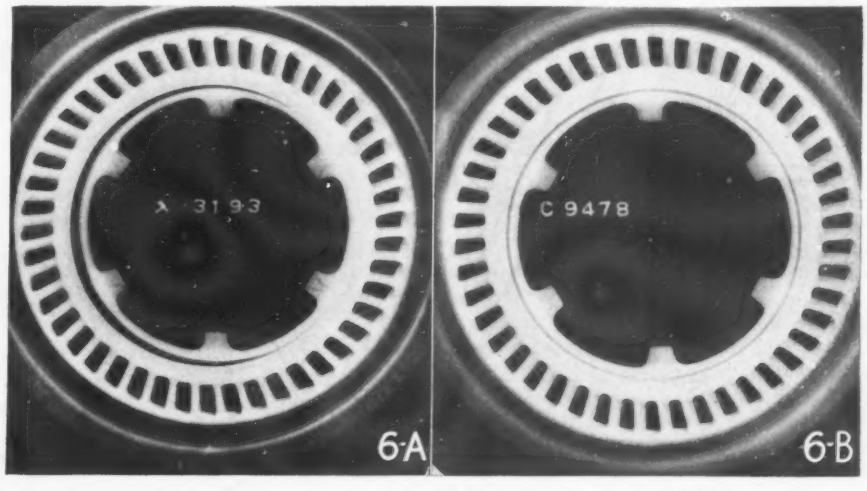


# Progressive Heating, Quenching

**. . . eliminates brittleness and warpage of small parts, increases output greatly. Setup employs induction heating unit**

By A. R. HOTCHKISS

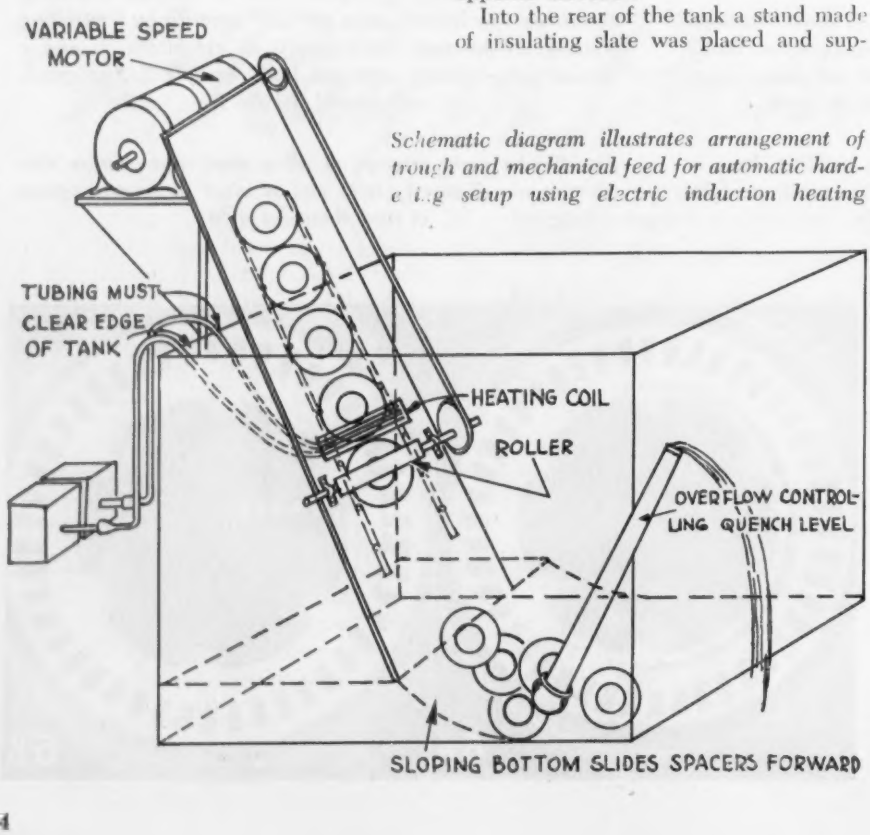
HARDENING such small parts as spacers has been exasperating to the metallurgist and production personnel in many shops for years because of inability to keep down brittleness and prevent warpage. Loss from these two evils in one shop recently reached as high as 80 per cent on some batches. A little insignificant job at the best, but one very necessary in assembly, it couldn't be neglected. Even when time was taken to slip them on long carriage bolts and pull them down tight with an end plate and nut before placing them in the draw furnace, the loss of warpage was out of reason.

Finally it was suggested that a way out might be found by way of a small electric induction heater. The manufacturer had told us very little about the machine when he sold it to us. This left me free to try anything, which after all does have its advantages from an experimental viewpoint. The idea of heating and quenching progressively in this case seemed worth an early investigation since from a half to two thirds of the part would be below quenching temperature while the rest was in treatment. I hoped this would hold the part from warpage while correct timing would bring the part up to desired hardness without over treatment resulting in brittleness.

The first step taken was to make a sheet metal tank of such size as to fit into the work tray of the induction heater in order to be able to regulate the level of the quench below the heating coil. This was done by putting the overflow in the form of an arm and elbow of pipe which fitted snugly enough to stay in any position to which it was turned. The end of the pipe scribing the circumference of a circle raised the level as it was turned upward and lowered when moved in the opposite direction.

Into the rear of the tank a stand made of insulating slate was placed and supported rigidly on the rear edge of the tank itself. Down its sharply sloping face and below the upper edge of the tank level, a slit of just the width and length to allow the heating coil of four turns of the ⅜-in. copper tubing to slip halfway through (see diagram) and allow a clear space for the spacer to be slid down the face of the stand, through the heating coil and on into the quenching solution below. Strips of insulating material were bolted into place to guide the part through the coil without touching it and at the same time hold it against the face of the stand. The quench level in the tank was brought up to 1 in. below the heating coil.

Spacers were slid through by hand by means of asbestos cord at various speeds and checked for rockwell C readings until it was determined that proper hardness and evenness of readings were obtainable without warpage, even after being drawn while lying loose in the furnace. This latter check was made to prove to ourselves that the general effect of the treatment did not introduce internal stresses that reacted in the same way as they did in an overhardened part drawn back. In actual practice it was proposed to treat up to proper hardness and eliminate the draw entirely.




*Schematic diagram illustrates arrangement of trough and mechanical feed for automatic hardening setup using electric induction heating*

### Automatic Feed Developed

From here on our job was to refine and improve the stand; develop an automatic feeding system for the spacers whose speed could be varied evenly through a range applicable to all types and sizes of spacers that might be treated; and circulate the quenching solution around the part being quenched.

The guides on the stand were made adjustable by assembling the bolts holding them in slots that allowed spacers of various diameters to be accommodated. The heating coil slot was lengthened for insertion of heating coils of various diameters.

In regard to the automatic feed, approximately 2 in. below the quench level a rubber covered shaft was mounted on spring supports across the pathway followed by the spacers. The end of the shaft extending over the edge of the stand carried a grooved pulley and was thus belted to a fractional horsepower, direct current variable speed motor into which a reduction gear had been built. By this means a slow variable speed motion was obtained.

Before starting the operation enough spacers are introduced to fill the guides down into the roller. Then the heater is turned on, the variable speed motor started. Then the operator keeps the guides filled. By adjusting the motor speed, the proper movement is easily determined to give a rockwell C reading of 50 to 60. The first spacer through is caught and fed back through again.

The inlet for the quenching solution is introduced through the sidewalls of the tank by means of tubes extending inside so that the flow circulates the water from both sides over the front and back of the spacer at the quenching level, thus

(*Please turn to Page* 162)

# Engineering NOTES

## Grind Helices to Order

To produce the plunger helice controlling amount of fuel delivered by injection pumps to extreme accuracy necessary, helices are ground in specially designed machine using a Norton grinding wheel ¾ x 1/16 x 5/32-in., operated at 40,000 rpm by an air turbine spindle. Unique micrometer type gage with high optical magnification is employed to measure accuracy of operation.

• • •

## New Rustproofing Material

A phosphate type of finish for iron and steel, providing protection from rust as well as a base for organic finishes, has been developed by Du-Lite Chemical Corp. With an oil dip, it is a satisfactory finish by itself for many applications. As a paint lacquer base, the crystalline surface of the microscopically porous coat affords such a strong "grip" that chipping or peeling is said to be almost impossible. The finish meets Army specifications for its type, and was developed under a company fellowship at Syracuse University.

• • •

## Coating for Zinc

The Bonderizing process, best known as a paint base coating for iron, steel and zinc surfaces, also may serve to protect zinc-coated products and zinc-base die castings from corrosion where no paint is applied. This treatment results in the conversion of their surface to an insoluble phosphate coating that substantially retards the development of the white salts of zinc corrosion on such products. The finish becomes an integral part of the surface through chemical reaction with the metal. It forms equally well in recesses and holes and on flat surfaces. The process is unaffected by heat used to remove moisture or to dry paint.

• • •

## Smallest Unit of "Nothing"

Dehydration of blood plasma, penicillin and foods provided the know-how for vastly increased industrial applications of high-vacuum by which liquids are "boiled" at temperatures as low as freezing. In air pressures that approach the absolute vacuum of interstellar space, heavy-molecule oils are fractionally distilled, magnesium is extracted from ore, and lenses are glare-proofed by molecular bombardment. These new high-vacuums are pulled by recently developed diffusion pumps, operating in tandem with compound roughing units of mechanical pumps or steam jet evactors. In multiple stages, this equipment can reduce air pressure to below 1 micron (one-thousandth of a millimeter). By using vapors such as those of mercury to entrain the remaining air molecules, a diffusion pump further decreases pressure to (a hundred-thousandth) 0.00001-micron. *Process Industries Quarterly.*

• • •

## Lilliputian Tubing

Research on an important material for the government has made possible the development by North American Philips Co. Inc. of an ultra-thin-wall seamless tubing in various diameters, with wall thickness ranging from 0.0001 to 0.001-in. The tubing can be made of gold, silver, copper, nickel, chromium and other metals. It is uniform in thickness and absolutely air-tight. Possible fields of application are as yet unexplored, but its suitability for use in delicate instruments and high-frequency radio circuits has been suggested.

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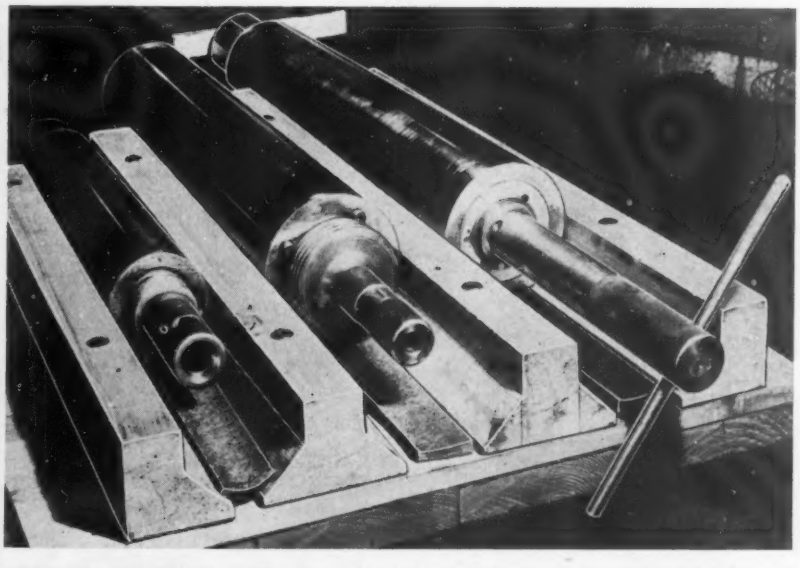


**PLUG GAGE RACK: Cleaning and oiling of large plug gages, which must be free of all dirt and grit before being inserted into chambers to be checked, is solved at one stroke by storing gages on oil soaked felt strips between dividers of the rack shown here. One or two turns on the felt prevents rust and cleans the gage, according to Westinghouse Electric Corp.**

## Improves Thermocouple

Heat resisting stainless steel soon will replace another material in the secondary protecting tube of platinum thermocouple assemblies manufactured by Brown Instrument Co., Philadelphia. It is said the change will result in longer service life for the protecting tube assembly by eliminating freezing of tube and checking oxidation; also it will facilitate easy removal of assembly for inspection. Thermocouple assemblies are used with two-hole silica block for glass tank crowns.

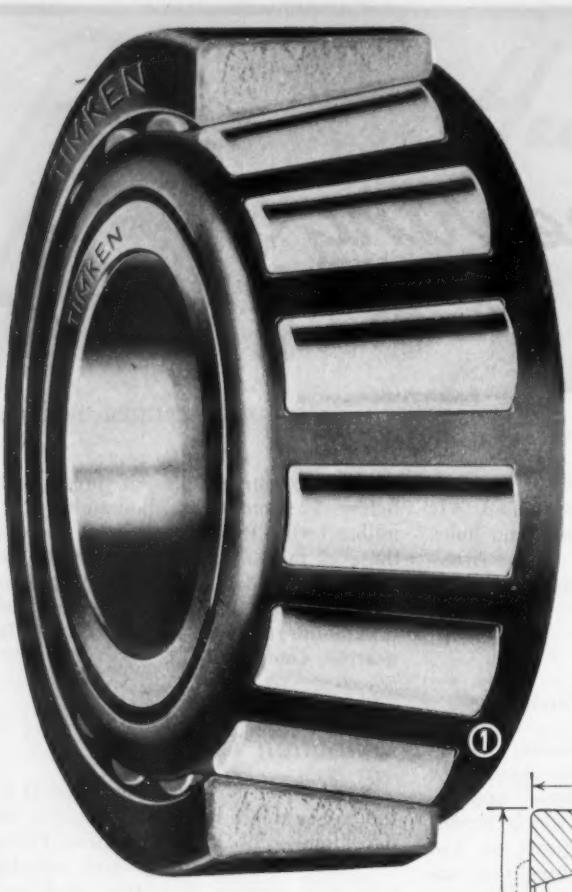
• • •

## Thermit Castings

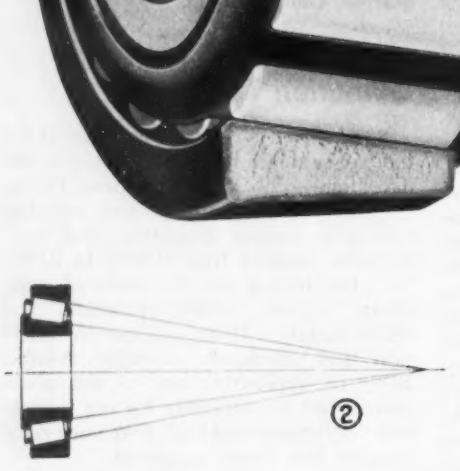
The thermit welding process now has been adapted to the production of steel castings. As in making thermit welds, finely divided aluminum and iron oxide are ignited in a crucible. The molten metal then is poured into a mold after cooling somewhat from the peak temperature of 4000° F. A typical steel analyzed C 0.25, Mn 0.68, Si 0.11, Al 0.60, S 0.02-0.04 and P 0.02-0.04.

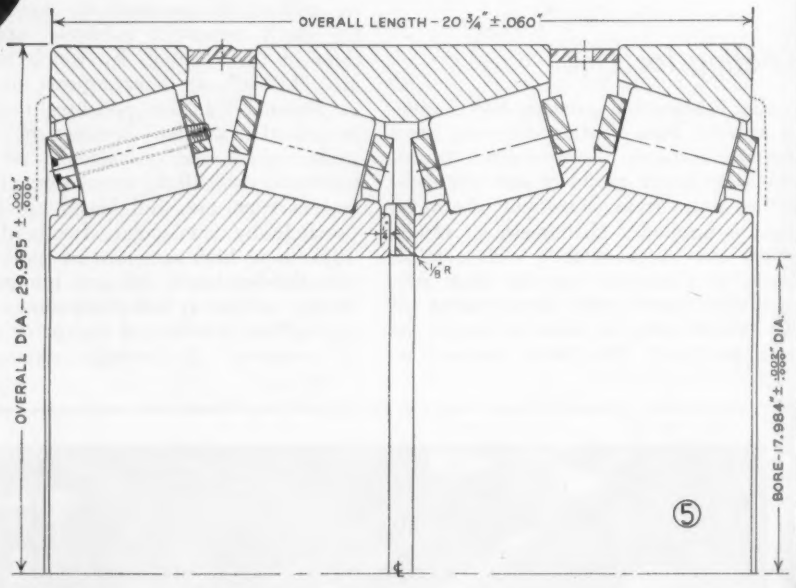
## Many Special Machines Help Produce

# TAPERED R




*Bearing rollers are automatically gaged and grouped for selective fits; outer and inner races gaged by operators on special setups. Unique design, engineering and production features result in a precision famed wherever wheels and shafts must turn easily*



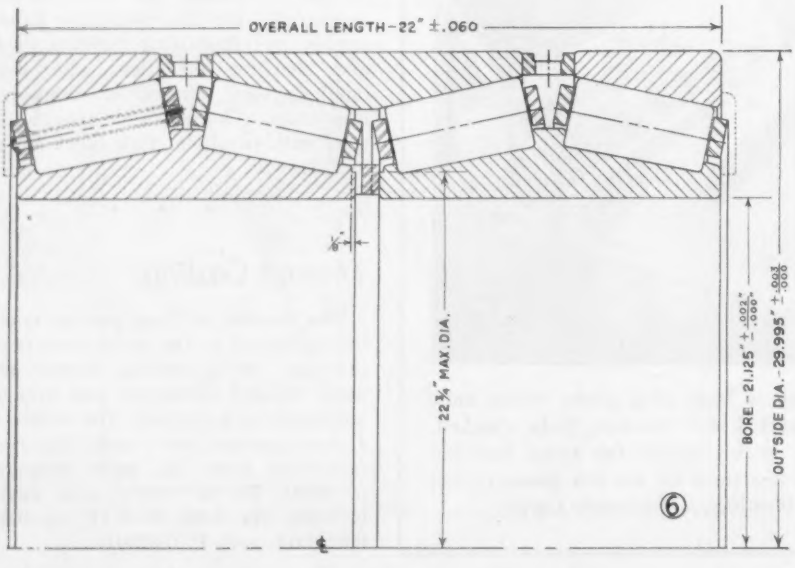




*Fig. 1—Tapered roller bearing as made by Timken consists of inner race (cone), outer race (cup), rollers and cage*

*Fig. 2—Sectional diagram showing how extensions of tapered contacting surfaces meet on bearing axis, thus obtaining true rolling motion*

*Fig. 3—Section through bearing shows how tapered surfaces provide wedge action that absorbs axial loads as well as radial loads, in turn enabling the bearing to carry loads from any direction*

By G. W. BIRDSALL
*Associate Editor, STEEL*

# ROLLER BEARINGS *At Timken*

DURING the early 90's when Henry Timken was a blacksmith in St. Louis, Mo., he developed the unique, highly efficient, tapered roller bearing which today bears his name. As he made his business grow from a tiny smithy to a 4-story carriage factory, he had seen that carriages should have better bearings. He was among the first to equip carriages with bearings of any kind, and quickly turned from ball bearings to the more efficient tapered roller bearing he had patented.

As a result, the Timken Roller Bearing Co. was founded in 1898 by Henry H. and William R., the hard-working sons of the first Henry Timken. In 1904 the business was moved to Canton, O., for reasons of transportation and supply. By 1922, it had grown by 200 times, showing an annual output of 22,550,000 bearings as compared with 120,000 in 1902.

Today, production facilities covering more than 2,000,000 square feet of floor space at Canton, Gambrinus, Columbus, Wooster and Mt. Vernon, O., have a still greater output. Canton plants alone have over 13 miles of standard gage railroad track. In 1916 the company built its own steel mill to furnish the special high-grade electric-furnace alloy steel required for Timken bearings, a plant today rated one of the world's largest producers of high-quality electric-furnace steel.

**Excellent Performance:** Wherever a precision bearing is wanted to handle heavy loads at high speeds, there you will usually find a Timken tapered roller bearing. In fact, they unquestionably dominate anti-friction bearings in automotive and railroad fields as well as in all types of industrial machinery. They are standard equipment in a majority of all makes of cars, trucks and busses. Railroad cars and locomotives, steel-mill roll necks, machine-tool spindles, oil-field machinery, compressor crankshafts, paper making machines are but a few of industry's tough jobs taken over by Timken bearings. The use of these bearings has so revolutionized previous ideas of bearing performance that it is well worth while to briefly examine the mechanical principles that have made possible this exceptional performance.

**Load-Carrying Ability:** An outstanding characteristic of the tapered roller bearing is its ability to carry both heavy thrust and radial loads. In referring to Figs. 1, 2 and 3, the arrangement of the tapered rollers between tapered inner and outer races is such that the thrust (axial) loads are transformed to a balanced radial load on each of the rollers within the bearing and absorbed by the tapered surfaces in the same manner that a wedge transforms a force applied lengthwise into a force acting at right angles to the surfaces in contact.

True rolling action (Fig. 2) is obtained between rolls and raceways, since lines produced coincident with the faces of the rollers and races all meet at a common point on the axis of the bearing.

Pressure between roll and raceway is distributed uniformly over the entire length of each roller. The *line contact* which withstands the combination of radial and thrust loads (instead of *point contact*, as with ball bearings) accounts for the tremendous capacity of tapered roller bearings. Each roller is positively aligned with respect to a rib on the inner race and therefore is made to carry its proper share of the load. See Fig. 4. To

*Fig. 4—Shoulders on inner race keep rollers positioned lengthwise so they divide the load equally, thus extending life*

*Fig. 5—Section through steel mill roll neck bearing before redesign*

*Fig. 6—Note how redesigned bearing has same outer diameter, yet its larger bore permits a neck stress of only 65% of former value. Also this new bearing has a rating that will give double the estimated life of the bearing in Fig. 5*

*Fig. 7—Great range in size of bearings is indicated here. Girl holds 8-oz, ⅜-in. bore unit alongside 9,500-lb, 51-in. outside diameter steel mill roll neck bearing*

*Fig. 8—Setup for reading spectrograph charts in the metallurgical laboratory*

*Fig. 9—Large outer races are machined on boring mills and other heavy equipment. This is a typical setup*

*Fig. 10—Automatic 4 or 6-spindle screw machines make small races*

*Fig. 11—Large races are carburized in pit type furnaces as shown here*

obtain this correct load distribution, the rollers are properly spaced around the cone by the cage, Fig. 1.

With initial load distribution accurately provided for, minimum deformation of the roll occurs. Translated into terms of bearing life and bearing performance, this means greater precision, greater rigidity with less wear and consequently longer life of bearing and the machine parts that it supports. Machine tool manufacturers have found that the extremely rigid mountings made possible by these bearings permit machining practices said to be impossible with any other type of mounting.

**Controlling Wear:** Thus, the design inherently reduces wear to a minimum. Further control of wear is obtained by heat treating the cup (outer race), cone (inner race) and rolls. An extremely hard surface (60-62 rockwell C) is produced by case hardening, a process that at the same time retains a tough elastic inner core.

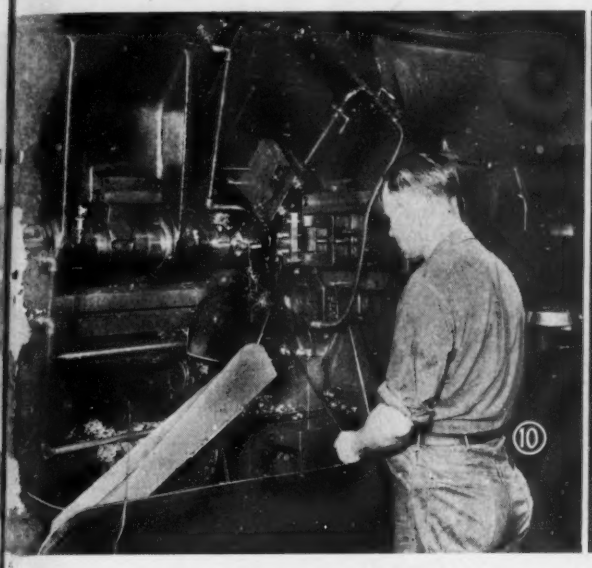
Timken bearings are rated on the basis of a 3000-hour working life. If 100 bearings are loaded at rated capacity, their average life will be five times this figure, or 15,000 hours. Bearings will last ten times longer at one-half than at full load. Likewise, their life will be only one-tenth normal if the load is doubled. The above relationship of under and overloading holds for practically any type of anti-friction bearing and to a certain degree applies to life expectancy on gears and many machine tool mechanisms, report Timken engineers.

**Continued Improvement:** For many years, the company has maintained a large research staff with the most modern facilities for the purpose of devising and developing further improvements. Typical of these efforts toward continual improvement is the new line of bearings for steel mill roll necks. Here the problem was to rearrange the proportions of present bearings to pack increased bearing capacity into a limited space.

Paul Haager, assistant chief engineer, Industrial Division, explains the limits. "The maximum outside diameter of a bearing for a specific mill roll size is obviously restricted by the outside dia eter of the mill roll and the clearanc provided. Maximum bearing width limited since stress on the roll neck creases directly with bearing width. Th neck stress for a given load also vari inversely as the cube of the bearing bor Thus the inside diameter of the bearing must be as large as possible and still provide the necessary capacity."

In making the redesign, all bearing roll proportions were analyzed and the most satisfactory proportions worked out for a specific job. After this analysis was completed for a single size bearing, it was possible to lay out a complete line of roll neck bearings for all mill sizes ranging up to 60-in. mills.

Steel mill type bearings so redesigned have ratings up to 40 per cent higher than bearings supplied on the previous design. Proportions in these new bearings provide more internal bearing rig-



idity, better distribution of load to the rollers within the bearing, and greater mill rigidity—in turn leading to greater precision in rolling.

Figs. 5 and 6, showing sections through old and new designs respectively, reveal the change in proportion. The new bearing, Fig. 6, has a rating that will double the estimated life of the bearing, yet it has the same outside diameter as the old bearing, Fig. 5. Larger bore of the new bearing means that neck stress is only 65 per cent of that with old bearing.

**Wide Range In Size, Style, Application:** Timken tapered roller bearings are made in an amazing number of sizes and types for an almost endless variety of applications. Sizes range from the small unit the girl in Fig. 7 is holding in her hand up to the large bearing alongside of her for back-up rolls on a steel mill. The small unit has a ⅜-in. bore, a 1-in. outside diameter, is 3/8-in. wide, weighs 8 oz, has a single row of rolls with a capacity of 250 lb at 50 rpm. The large bearing has four rows of rolls, measures 36 in. wide, 51 in. outside diameter, has a 35½-in. bore. It weighs 9,500 lb and has a radial load capacity of 4,000,000 lb at normal mill speeds.

An idea of the great variation in types and sizes can be had from the fact that 3500 different ones are cataloged, divided into approximately 63 different classes for industrial machinery and into many other classes for automotive and railroad equipment.

**Materials:** Since analysis and metal structures also greatly affect bearing performance, all Timken bearings are made from high-quality nickel-alloy steels produced in the company's electric furnaces at Canton. Bearings up to 6-in. bore, 10-in. outside diameter are made from SAE-4620 stock; larger sizes from SAE-3312, a steel somewhat tougher and more shock resistant, with 3¾ to 4¼ per cent nickel, 1½ per cent molybdenum. Stock is case carburizing type, since all bearing parts except the cage are carburized to produce an extremely hard case for maximum wear resistance.

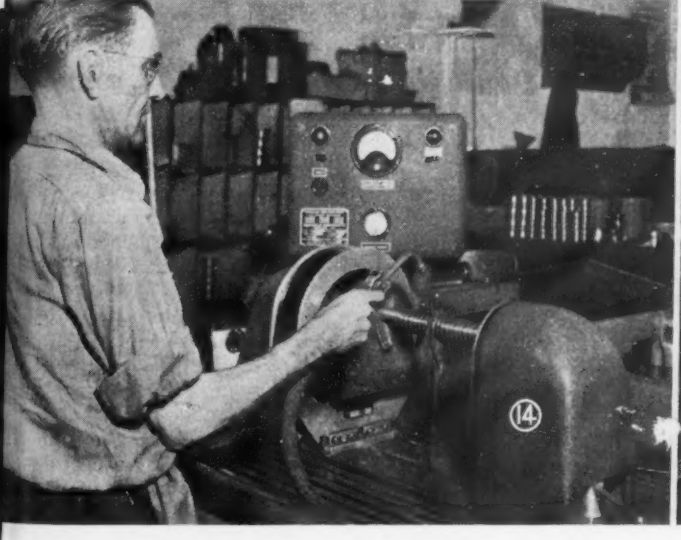
All Timken tapered roller bearings

*Fig. 12—Races are heated for hardening in rotary furnaces like the unit at right, then to avoid distortion are quenched in special dies in machines such as shown at left*

*Fig. 13—Finish grinding by skilled operators comes before final checking*

*Fig. 14—Quantity of small races being Magnaflux tested for hidden flaws*

*Fig. 15—Special setup for gaging cones (inner races) employs tapered surface of race to magnify radial dimensions. See text for detailed explanation*



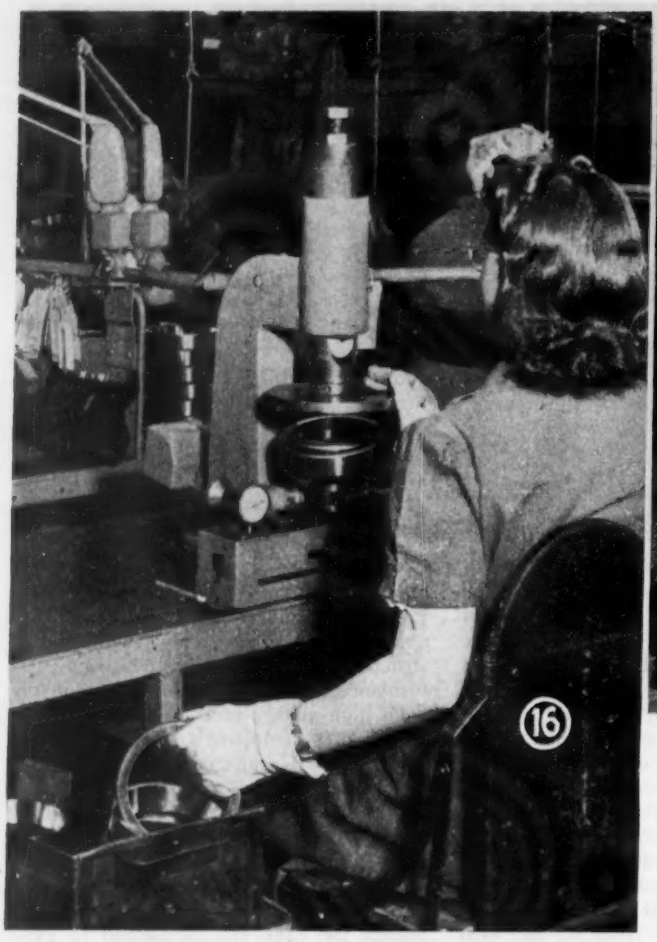
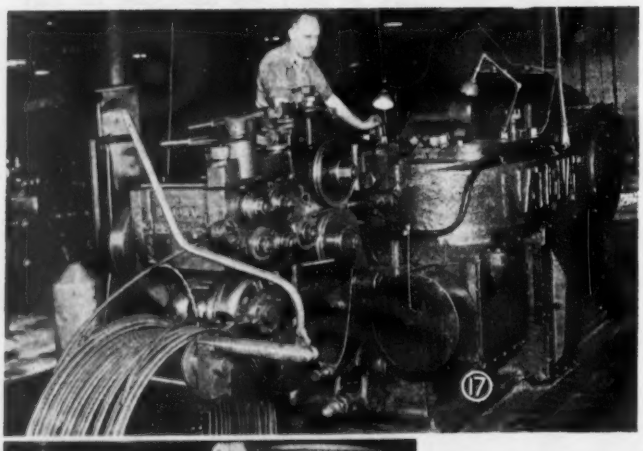


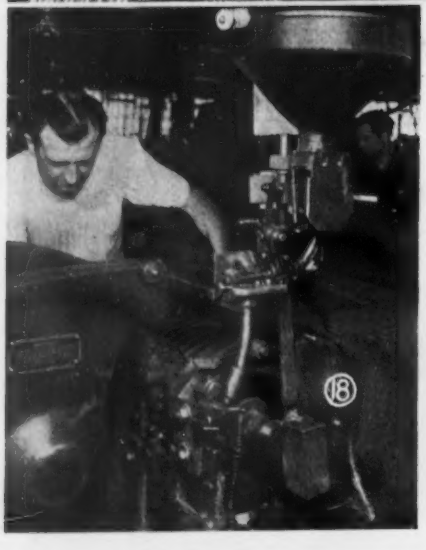
*Fig. 16—Outer races (cups) are gaged here in a setup similar to that shown in Fig. 15*

*Fig. 17—Upsetters make tapered rollers by cold forming heavy wire stock*

*Fig. 18—Centerless grinding from two to six times, depending upon size and precision, is done in units like this in production of rollers. Note automatic hopper feed*

*Fig. 19—Overall view of automatic gaging machine for separating rollers into groups meeting close dimensional tolerance ranges*





consists essentially of four elements:

—inner race, designated as the cone because of its shape

—outer race, which fits around the cone and roller assembly and is called the cup

—tapered rollers which roll between cup and cone

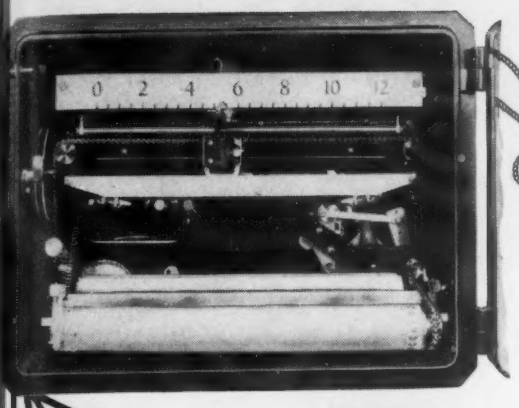
—cage which serves as a retainer to make assembled rollers and cone a single easily handled unit; also it maintains proper spacing between rollers.

**Production of Races:** For bearings above 10 in. outside diameter, both inner and outer races are made of forgings. Smaller size bearings have races made from seamless tubing. Fig. 8 is a view in the metallurgical control laboratory showing an operator reading density of lines on a spectrographic plate, part of the system for checking the percentage of various elements in the steel before it is approved for use in manufacturing.

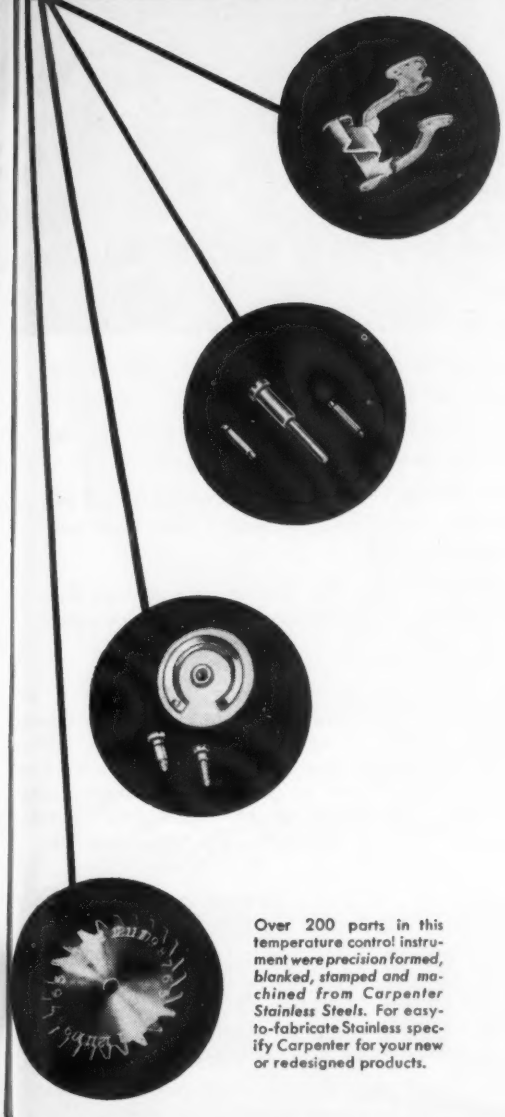
Large races are machined on turret lathes or boring mills such as the one shown in Fig. 9. Small races are handled on 4 or 6-spindle automatic screw machines. Fig. 10 reveals the working head of one of these large automatics. Small parts then are case carburized in rotary carburizing furnaces, large races being loaded into racks and carburized in vertical pit-type units as in Fig. 11.

Then races are hardened by reheating in rotary furnaces and quenching in oil while clamped in dies, Fig. 12. These dies are so designed as to control flow of oil to produce fast uniform cooling action on the part, thus avoiding any tendency towards distortion.

Now the parts are ready for finish machining which is done by grinding. Timken has one of the largest grinding departments in the world, using approximately $500,000 worth of grinding wheels yearly. More than $20,000 is



# How to IMPROVE YOUR PRODUCTS and LOWER UNIT COSTS



## REJECTS CUT 50% ON PRECISION INSTRUMENT PARTS WITH CARPENTER STAINLESS

When a manufacturer can improve his product and lower unit costs at one and the same time, his methods bear investigating. Here's the story of a control instrument manufacturer who did just that by switching to uniform, easy-working Carpenter Stainless Steels.

In the first place, parts for temperature control instruments like this must be precision-made to give accurate readings. Second, they must be long wearing to provide years of trouble-free service. Third, they must be corrosion resistant to keep functioning in the face of corrosive industrial fumes and dust.

All signs pointed to Stainless Steel. But *ordinary* Stainless wouldn't do. It had to be Stainless that would machine, blank, and form easily and economically, lot after lot.

You can imagine how pleased the manufacturer was when he found that easy-working Carpenter Stainless Steels not only filled the bill on every count, but *cut rejects in half!*

It just reaffirms a point we've been constantly stressing; you can do it better at lower cost with Carpenter Stainless Steels. Keep this in mind when you plan your new or redesigned products. And remember your nearby Carpenter representative can give you experienced help in selecting the *right* Stainless for the job.



Over 200 parts in this temperature control instrument were precision formed, blanked, stamped and machined from Carpenter Stainless Steels. For easy-to-fabricate Stainless specify Carpenter for your new or redesigned products.

FOR SHORT CUTS to making finer products at less cost, send for your copy of "Working Data for Carpenter Stainless Steels". A note on your company letterhead, indicating your title is all that's necessary.

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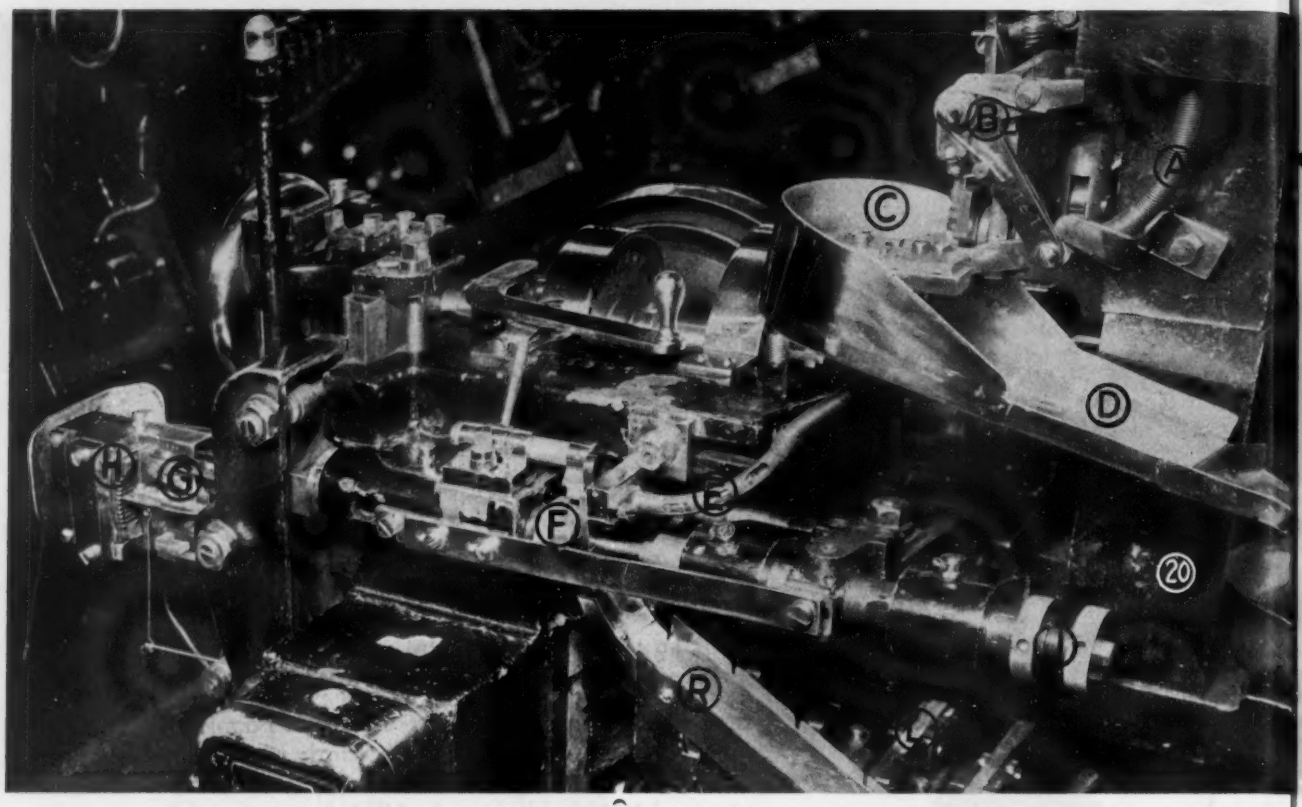


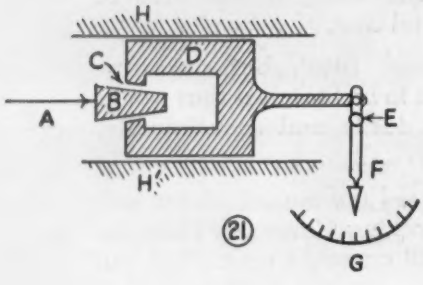




*Fig. 20—Closeup of automatic gaging head diagrammed schematically in Fig. 21. Operation is detailed in text*

*Fig. 21—Simplified schematic of elements of automatic gaging heads that separate rollers into precise tolerance ranges. See Fig. 20*

*Fig. 22—Semi-automatic setup for assembling and closing bearings. Girl fills cage, places it in automatic 2-station closing machine which discharges onto belt conveyor*

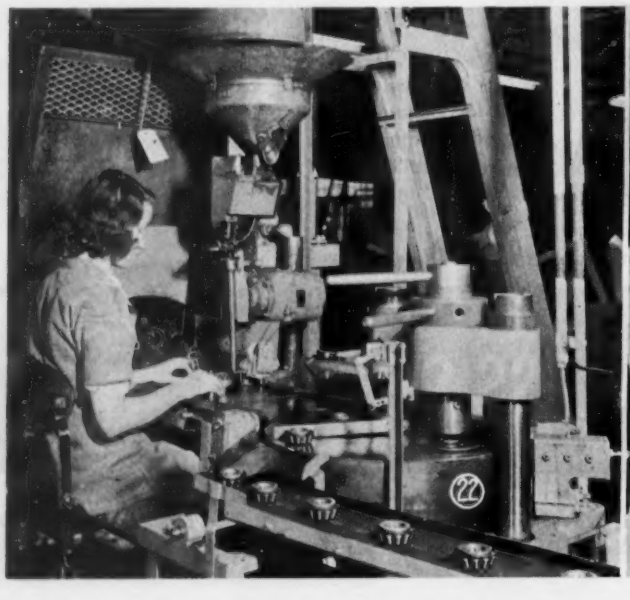
*Fig. 23—The trained ear can quickly check a bearing by its sound as it is operated at high speed in a special setup as shown here. Note belt conveyor*

spent each year for diamonds used in dressing the wheels frequently to assure the smooth operation required for the finished parts. While many of these grinding operations are handled on automatic machines, much still depends upon skilled operators like the one in Fig. 13.

Running surfaces of cones, cups and rollers of precision type bearings are finished to a surface smoothness down to 5-6 microinches.

**Special Gaging Setups:** Timken is very proud of the precision standards it maintains in its bearings. While it is not difficult to set up standards, maintaining them is not done without effort. Thus, 35 per cent of all employes devote their full time to inspection, and many gaging machines of almost unbelievable

(*Please turn to Page* 164)



# FORT PITT *Alloy Steel Castings*

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# Milling FORGED CYLINDER HEADS

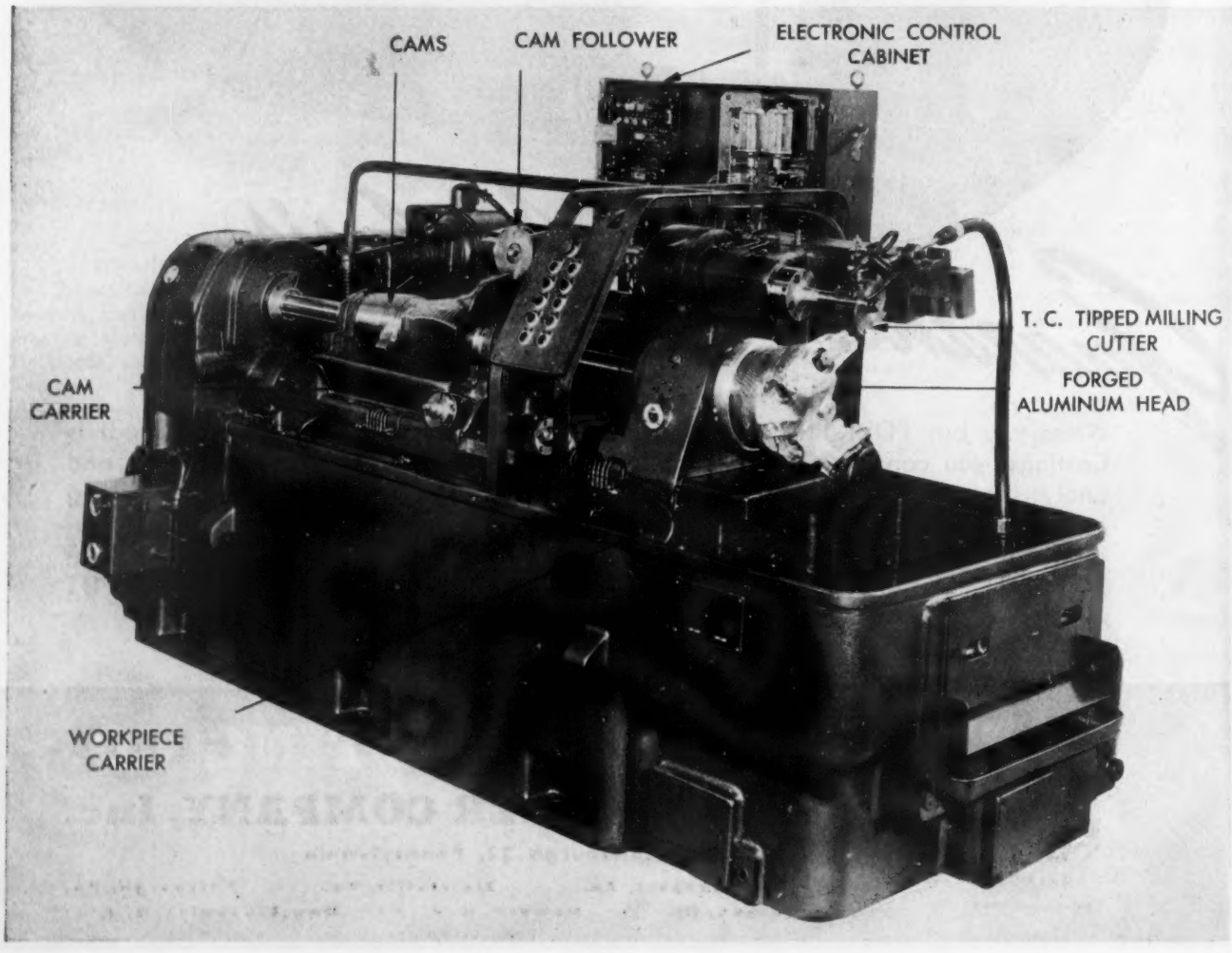
*New method features complete automatic cycle after loading through combined hydraulic and electronic control of cutter head*

MILLING circular, partial and dome fins on a forged aluminum airplane cylinder head is performed by a special machine which will handle in two operations the milling of the same number of fins which formerly required four machines and four separate operations. Milling of circular and partial fins is done in one operation . Milling of dome fins requires a change in cams, cutter and work-holding fixture on the machine shown in the accompanying illustration.

A combination of electronic and hydraulic controls is employed. Feature of this machine, made by Sundstrand Machine Tool Co., Rockford, Ill., is the arrangement for controlling cutter load. The path followed by the cutter is very irregular and constantly changing in shape and depth for each successive fin. With the automatic electronic feed control, the fragile cutter is kept loaded to full capacity. If the cut becomes light, the rate of feed increases; and if the cut becomes heavy, the rate of feed decreases. Rate of feed varies automatically within a range of 6 to 60 ipm, with the actual rate depending upon depth of cut and horsepower consumed.

A complete automatic cycle is followed after loading. Operator merely presses control buttons and the pivot arm which carries both cutter and cam roller rapidly travels down to within ⅛-in. of the start of the cut. The shaft which carries master cam and work part then starts to rotate. The pivot arm feeds the cutter into the part until the cam roller contacts the cam. Cam then controls path of the cutter until a complete fin has been cut. The pivot arm, hydraulically actuated, then moves cutter away from part and cam roller away from master cam—the shaft carrying cams and work part rotates back, at high speed, to its starting position. The cam carrier and work carrier slides then are indexed laterally so that the next cam is in position under the cam roller and the work part is in position for cutting the next fin.

Cutting and indexing cycle described continues automatically until the last fin has been cut, after which the cam car-



WELL, JACKSON, I GUESS THIS HAUL WILL PETER OFF COME V-J!
NUH-UH! THIS THINSTEEL STRIP'S AN ALL-TIME ITEM WITH WHAT IT TAKES TO KEEP ME RIDIN'!

Uncanny accuracy to gauge and strict control of physicals made Thinsteel a high priority material for war time light metal parts. These same precision qualities, pioneered by CMP, will continue to deliver more usable feet per pound, more finished parts per ton. Your fabrication of light gauge strip steel can be trouble-free, extra-profitable if you'll use CMP's cooperative advisory service.

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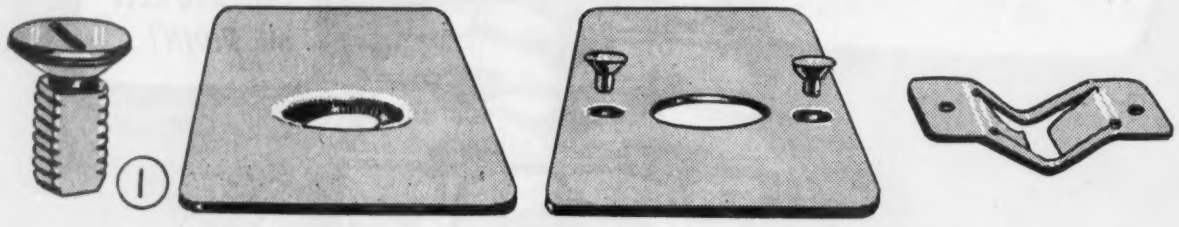
GIVES MAXIMUM PRODUCTION PER TON

rier slide and the work holding slide return to starting position, and the machine automatically stops.

Irregular path of the cutter is controlled by a set of cams, one cam for each fin to be cut. Cutter head and cam follower roller both are mounted on a single casting which pivots on widely spaced bearings, providing direct cam control to cutter head. Master cams and work part are mounted on one splined shaft, thus eliminating the possibility of error between rotation of cams and rotation of part. Work part is rotated through its feed and rapid traverse cycle by an electrically controlled mechanical feed box. Linear index of cams from station-to-station is through a positive index plate and lead screw.

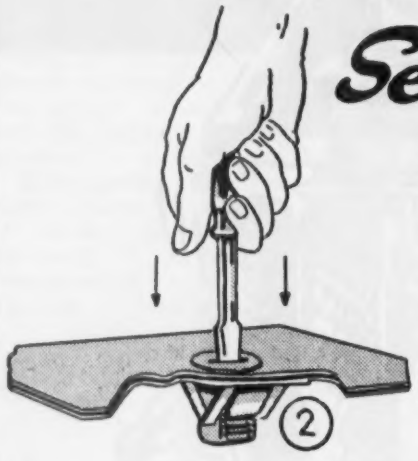
Work is totally enclosed during cutting cycle. With a completely automatic cycle, the operator can run one or more machines if so desired. There is no waste motion or cutting of air under the irregular cutting as adjustments are positive and the cutter can be set for rapid approach to within ⅛-in. of each fin. Either individual or a central coolant system may be used.

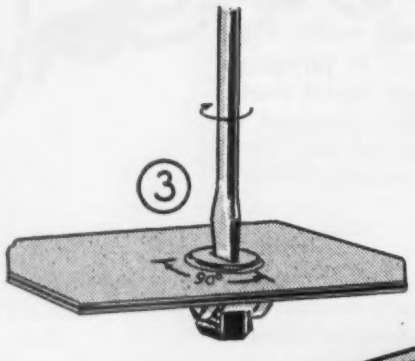
By combining several operations, considerable floor space has been saved over the old method of machining.

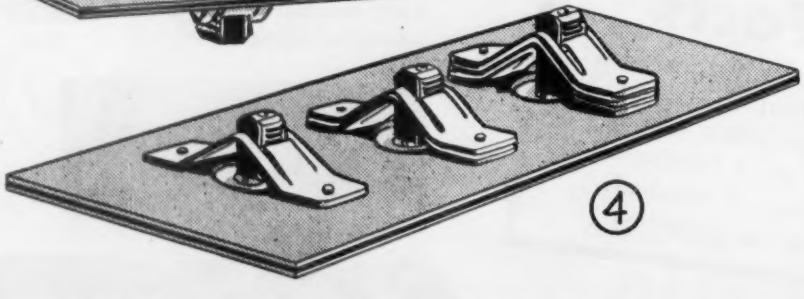



# Self-Aligning Fastener

*—is lightweight, easily and quickly inserted, and can be nested to handle heavy loads*




A LIGHTWEIGHT, self-aligning, spring-lock fastener of unique design which is believed to offer many advantages over other types has been developed by Carl P. Sorenson, chief standards engineer of Glenn L. Martin Co.

Known as the Carlso, after its inventor, the new fastener originally was designed to overcome difficulties in attaching aircraft cowlings, but has since demonstrated its adaptability as an all-purpose fastener for both aircraft and non-aircraft applications.

The Carlso fastener consists of two parts, a stud and a receptacle, shown in Fig. 1. The former has a squared shank on which two opposed sides are serrated, while the latter is of spring clip design and engages the serrations in the manner of a ratchet to secure the stud in place. As the serrations run the full length of the stud and the receptacle is extremely flexible, it is possible to use one length of stud for all applications as against anywhere from 30 to 40 lengths required with fasteners of the cross-pin type. Likewise, this permits starting the studs with the two pieces out of alignment and letting them align themselves as the studs are driven home.

To fasten a cowling with the new fastener, it is first brought into approximate visual alignment. As there is no cross pin, the stud can be removed to permit visual installation, although a horseshoe washer may be used to keep the stud in the dimpled hole when desired. Then the studs are started one at a time. After all studs have been started in their respective positions, they are then driven home with a screw driver, as in Fig. 2. A single sharp tap suffices for each stud. In this way it is possible to draw the cowling evenly and surely into place similarly to the manner in which a cylinder block is tightened. Misalignment of sheets does not interfere with operation of the fastener, for it is self-adjusting.

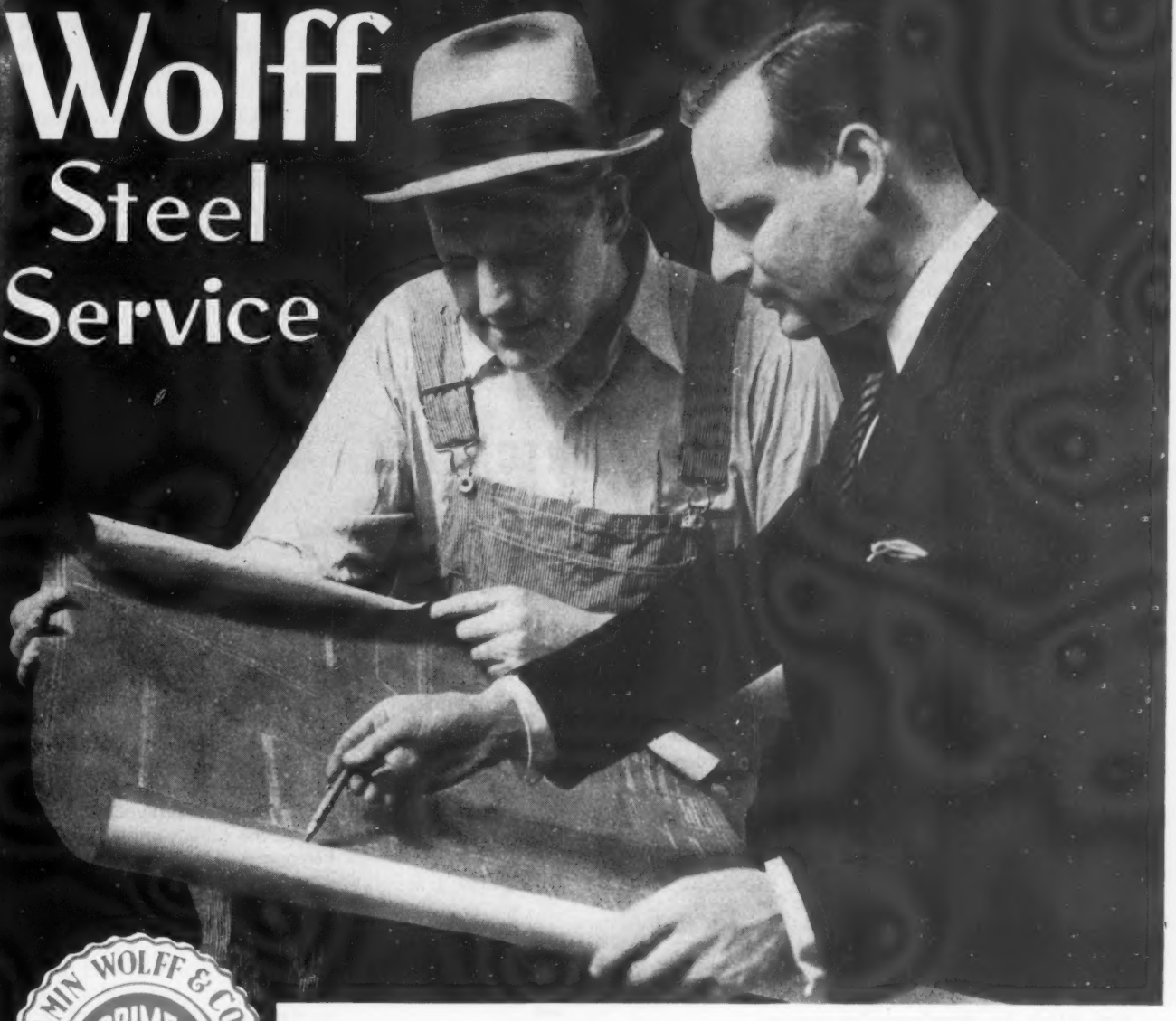
To remove a cowling fastened with the new Martin device, it is only necessary to turn the studs a quarter turn to either side to disengage them, as illustrated in Fig. 3. But, while studs are easily disengaged when desired, it is impossible for them to loosen due to vibration.

This fastener, in a number 7 size, is completely interchangeable with AN228 and AN232 fasteners as far as the drilling and dimpling of the sheets on which it is mounted is concerned. With a single receptacle it can withstand loads in excess of 900 lb, and this can be increased further by stacking that is, by nesting two or three receptacles to engage a single stud, as in Fig. 4.

In addition to cowling attachment and similar aircraft applications, other uses for which the new fastener is suggested range from attaching automobile crank cases and auxiliary freight car doors to inspection plates, heating and ventilating ducts, grain storage bins, and portable sheet metal buildings.

Fastener is easily and cheaply fabricated because no cross pin is necessary and one stud length may be standardized on for all purposes.

# First Things First means Wolff Steel Service



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# Tube FABRICATING TECHNIQUES

*Precisely fabricated tubular parts will be within reach of most designers for peacetime manufacturing because producers and fabricators are emerging from war experience well equipped to surmount technical difficulties*

By J. S. ADELSON
*Chief Metallurgical Engineer*
and
PARK HILL
*Chief Process and Inspection Engineer*
Steel & Tubes Division
Republic Steel Corp.
Cleveland

WELDED tubing has made tremendous strides over the past 20 years. Developed originally as a light gage mechanical tube with a wall thickness of about 1/16-in. or less for such uses as bedsteads and automobile exhaust pipes, its use has gradually expanded until there is practically no field of use for tubing where welded tube has not been given approval. In achieving this acceptance, welded tube has been put through extensive tests and trial installations and has proven its efficiency and durability beyond any question in the mind of the user. The outstanding example is the millions of feet of boiler tubing now in use.

The method of manufacture is essentially simple. The raw material, which is flat-rolled stock sheared to very accurate width, is formed cold into a butted tube and the edges butt-welded by a continuous process. Obviously, there are several major advantages to a tube made in such a manner, as the surface both inside and outside is that of a rolled product and therefore free from defects. Generally, no further operations are necessary except for the standard finishing operations such as straightening, cutting to length, inspection, etc., unless special tolerances or especially high physical properties are required, in which event the tube is given a cold draw pass to obtain these properties.

As a further improvement in welding technique, we have developed an electric nondestructive method of testing to which every foot of tubing is subjected.

### Engine Mounts

Welded tubing is used extensively for airplane engine mounts either in the X-4130 or 8630 analysis. These mounts must withstand not only the tremendous loads of tension, compression and torque generated by powerful engine units, but in addition, must be designed to provide for shock loads caused by landing, with the weight of the engine far forward of the wing's leading edge.

The tubing is made from cold rolled steel which has been annealed because experience has proven that the softer the raw material, the simpler the welding technique. Weldability also is improved by heat treatment prior to final normalizing operation. After welding, all tubes are normalized at about 1650-1700°F. This heat treatment results in complete recrystallization of the weld area, making it uniform with the rest of the tubing, and in addition, results in physical properties which conform to the requirements of various applicable specifications — 75,000 psi minimum yield point and 95,000 psi minimum tensile strength.

After normalizing, the tubing is given a tempering or stress relieving operation at 800 to 1000°F, depending upon size and chemistry of the individual heat. The normalizing operation is done in a continuous controlled-atmosphere furnace so that no scale is raised on the tube and original cold-rolled surface of the raw material is retained. The tempering or blueing operation also is accomplished in the continuous furnace immediately following the normalizing section. There is no scale except for a very thin blue oxide coating which is hardly measurable and does not interfere with any subsequent assembly operations. The tempering operation also accomplishes a two-fold purpose: It relieves any internal stresses resulting from the normalizing treatment and further increases the yield point and may even result in increased ductility.

After heat treatment, tubing is straightened, given the electric nondestructive test, checked in the laboratory to insure conformance to physical requirements, oiled, and cut to the proper length.

First operation in the assembly of the motor mount is forming the ring. This is done cold in a rolling machine which insures accurate dimensions in contour. The ring then is completed by welding the open ends. This welding operation and subsequent welding operations may be either arc or acetylene. General practice is to use a low carbon rod as filler metal since it has been found that sufficient alloy is picked up from the tubing in the welding operation to insure ample strength in the joint.

Second operation is to weld the lugs, which are usually steel forgings, to the ring. Since these must be aligned accurately, the ring is straightened after the lugs are welded to it. Heat treatment to relieve stresses may be applied during various steps of the assembly to insure freedom from stresses which might result in cracks.

In a Glenn L. Martin Engineering Lecture, prepared by John J. Buckley, it is pointed out that, although finished assemblies are held to close dimensions, it is impossible to keep them to the tolerances required without some machining. Dimensions then can be held to tolerances as close as plus or minus 0.005-in. by drilling, reaming, counterboring and countersinking. All of these operations on the finished mount are performed by a radial drill which requires two special fixtures.

Completed unit is subjected to Magnaflux inspection for cracks, laps, seams, inclusions, and other welding defects. This operation is applied primarily as a check on the assembly welding operations, since tubing already has been checked for quality by the much more sensitive tube-testing equipment.

### Aircraft Intake Tubes

Due to severity of fabrication operations, close tolerances, physical requirements of finished parts and rigid inspection, production of aircraft engine intake tubes presents a very difficult problem.

Tubing is made from low carbon steel to Aeronautical Material Specification 5053. To successfully meet the requirements, the tubing must have (1) sound homogeneous steel free from laminations, seams, blisters, jiggers, scale marks, etc.; (2) maximum ductility; (3) freedom on inside and outside from scratches, mandrel marks, shears, waves, dents, etc., and must be free from steel particles and abrasives, rusts and oxides; (4) ability to stand considerable reduction of area; and (5) close size and wall thickness tolerances.

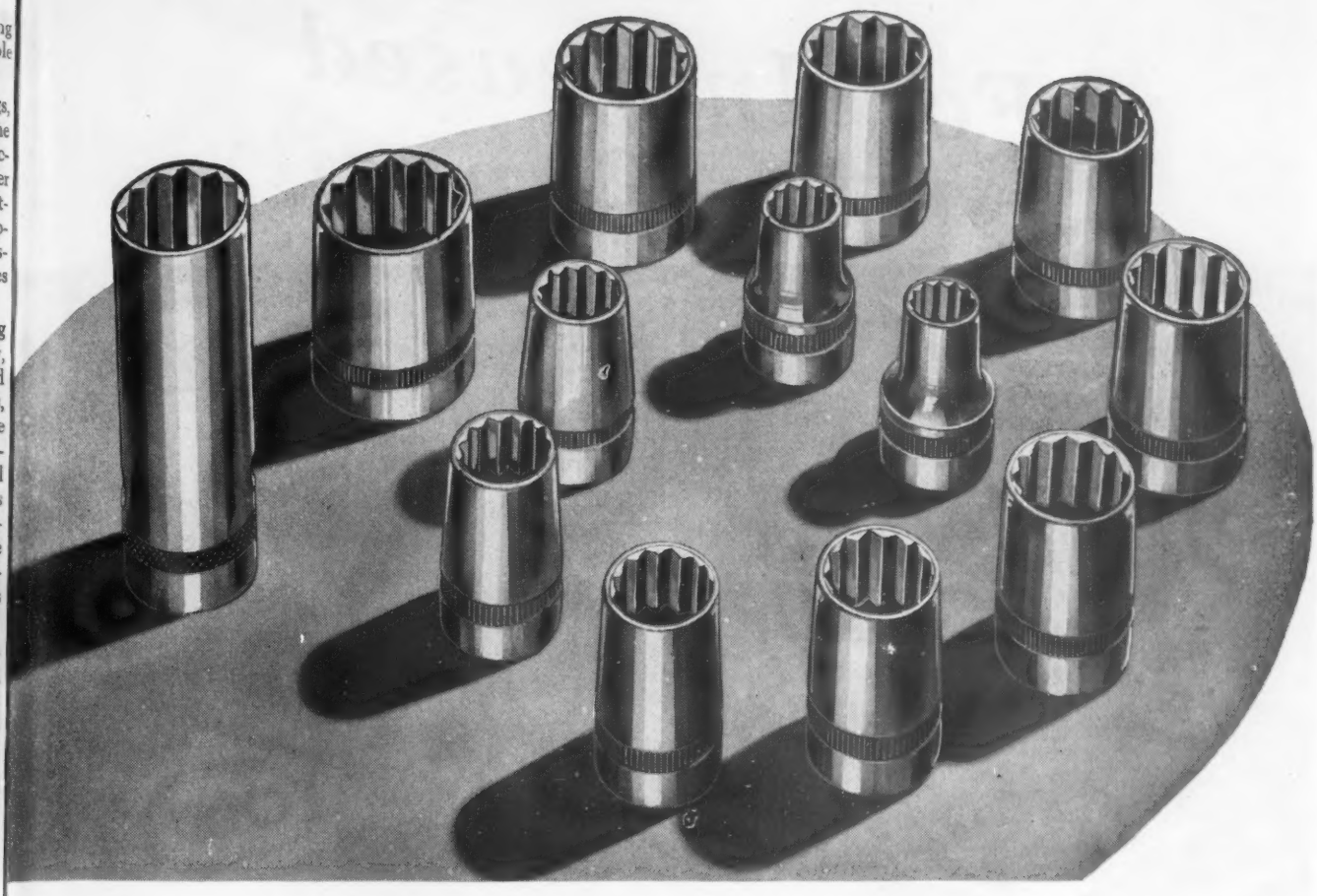
The problem as to whether these requirements could be met in a relatively large diameter, light wall tube (2⅜ in. to 2 9/16 in. by 20 gage) offered a real challenge to the welded tube manufacturers when it was presented to them in the early days of the war.

Starting with specially selected and closely controlled, cold-rolled steel, it was found that many operations were required to produce satisfactory tubing. Welding, heat treating, straightening and nondestructive electric testing required special equipment and supervision. Furthermore, the idea of absolute cleanliness required a general educational campaign.

Some of the problems involved are:

—Bending tubing 2 9/16 in. outside diameter by 0.035-in. wall thickness up

(*Please turn to Page* 174)



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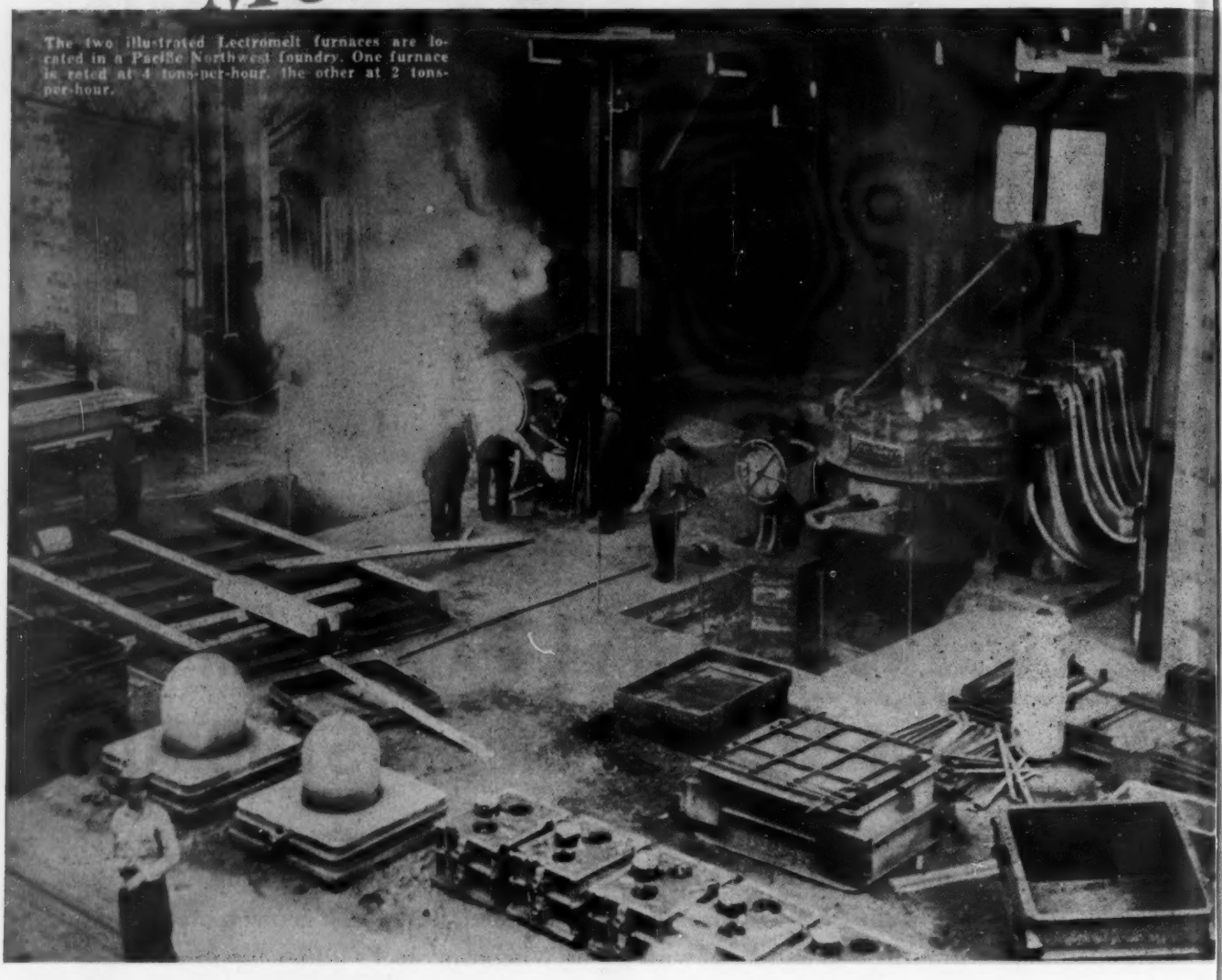
# For Increased Melting Capacity



The two illustrated Lectromelt furnaces are located in a Pacific Northwest foundry. One furnace is rated at 4 tons-per-hour, the other at 2 tons-per-hour.

★Standard Lectromelt furnaces customarily melt down their rated capacity of cold charge within one hour's time when operating on single slag basic practice or on acid practice. Most Lectromelt furnaces have poured heats considerably in excess of their rated hourly capacities to meet special requirements, when necessary. In addition, the top-charge feature permits quick charging by means of drop-bottom bucket, thus losing little time between heats.

Increased production demands for quality steels and irons are readily met by Lectromelt users. Write for information about our top-charge furnaces, available in sizes ranging from 100 tons down to 250 pounds.

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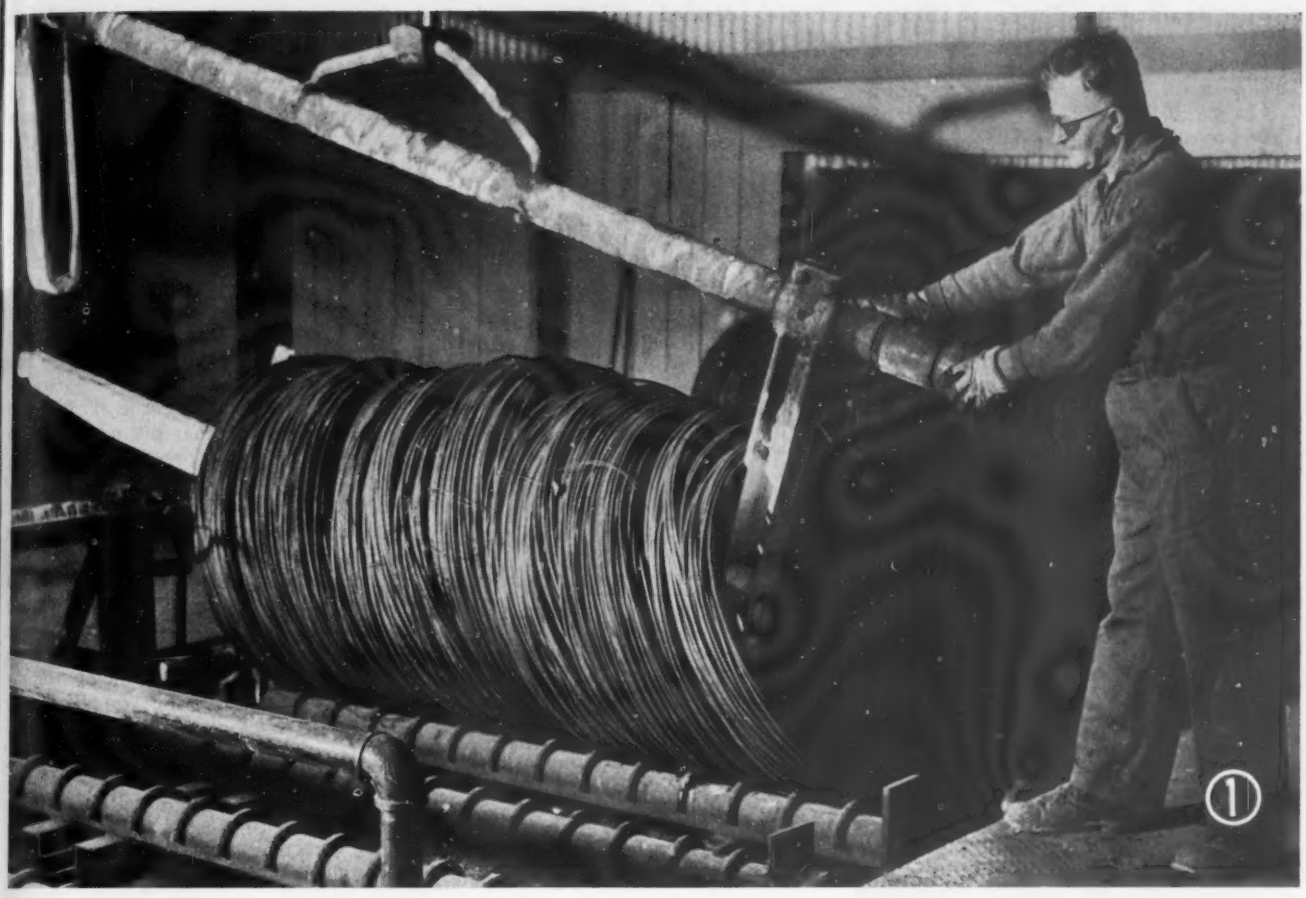


# Rod Conveyor

## ELIMINATES STOCK-PILING IN CLEANING HOUSE

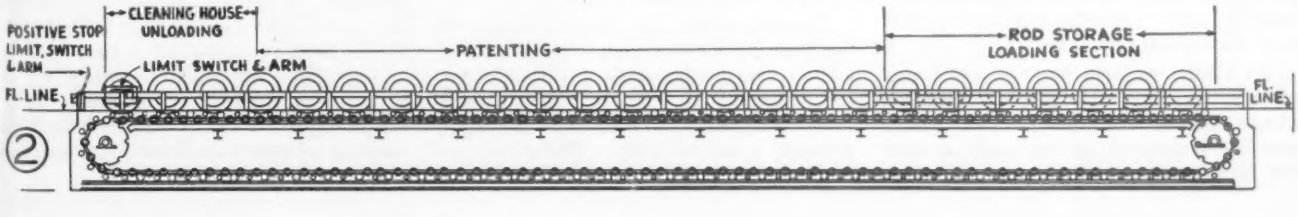
*Installation of 110-foot chain conveyor at eastern wire mill reduces obstructions and solves transportation problem between storage and cleaning departments. Conveyor is brought to rest by limit switch and is set in motion by operator of cleaning house crane. Coils are moved in upright position*

A SPECIALLY designed and constructed conveyor is easing the burden of materials handling between the rod storage and cleaning departments of the recently constructed wire mill of the American Steel & Wire Co., at Worcester, Mass. In addition, due to ease of control of the movement of the conveyor, no stock-piling of material in the cleaning house awaiting processing is necessary, with attendant elimination of confusion and reduction in the number of obstructions.

Hot-rolled rods used at the Worcester wire mill are shipped from the rod mill to the rod storage building of the wire mill in standard railroad cars. They are unloaded by a crane equipped with an open-end hairpin hook, lifting loads of approximately 3000 lb and placing them in bins in such a way as to enable crane operator to remove pin loads as a unit. To meet cleaning department demands, rods taken from bins are placed on conveyor at loading section end.

The conveyor, built by the Chain Belt Co., Milwaukee, is composed of two endless chains running horizontally and parallel, a few inches below floor level from the rod storage building to the

*Fig. 1—Unloading end of conveyor showing yoke for handling rods in and out of picklers*
*Fig. 2—Elevation of conveyor showing loading, patenting and unloading sections*



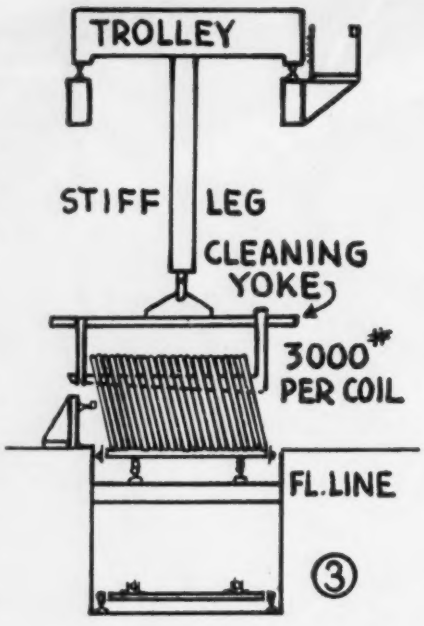
cleaning department, a distance of 110 ft. The two chains are connected by 4-in. diameter pipes welded to links spaced 18 in. apart. The conveyor is a full 7 ft in width.

When carrying the load, the chains ride on 6-in. diameter wheels with 1-in. flanges and set in a foot from each edge of conveyor. Rollers are spaced 18-in. apart from center to center and ride on rails whose centers are 4 ft 6½ in. apart.

On the top side of the conveyor is another set of 6-in. rollers, on which it rides below the floor line after passing over the end sprocket reel and travels in the reverse direction on the return trip. Inasmuch as the only load these rollers carry is the weight of the conveyor, it is necessary to have them set at intervals of only 3 ft or attached to every second link of the chains. The latter set of rollers are placed at the extreme edges of the conveyor and ride on rails 7½ ft apart. The absence of a heavy load permitted the designers to place the rollers in this position, where they do not interfere with loading.

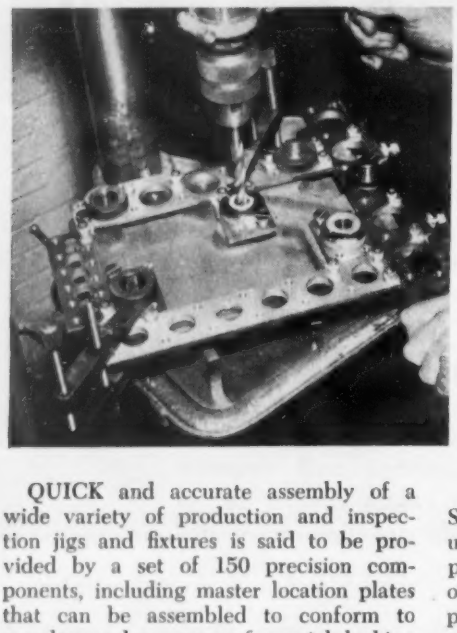
The coils of rod must be maintained in an almost vertical position to enable the crane operator to insert the cleaning yoke when removing them to begin cleaning operations. For this purpose a rail was installed running the full length of one side of the conveyor at a height of 2 ft above the floor level. The rod coils rest against the rail and slide along it it as the conveyor moves, being held in an almost upright position.

*Fig. 3—Method of handling rod coils at unloading section*




The conveyor is moved by a pair of sprockets at the cleaning house end. The sprockets are driven by a 15 hp motor, giving the conveyor a speed of 24.6 fpm As a pinload of rods reaches a predetermined spot in the cleaning house, it contacts a limit switch arm, stopping the drive motor. The load then can be removed by the cleaning crane. The crane operator moves another pin of rods into position simply by pressing a button, starting the drive motor.

The working parts of the unit are set into the floor so that all that is visible at the floor line are the links of the chains, their connecting pipes and return rollers, in addition to the rail and guide plates. Total depth of the unit below the floor line is 6 ft 8 in. Takeup sprockets are equipped with set screws by menas of which tension on the conveyor line may be satisfactorily adjusted.



***Production and Inspection Jigs and Fixtures Made from Set of 150 Precision Components Forming a***

# UNIVERSAL ASSEMBLY

QUICK and accurate assembly of a wide variety of production and inspection jigs and fixtures is said to be provided by a set of 150 precision components, including master location plates that can be assembled to conform to any layout by means of special locking clamps and screws; and combinations of drill jig bushings, drill bushing adapters and lock screws mounted on the location plate according to specified center distances of holes to be drilled.

Locating pins are inserted in drill bushings before final locking of the unit of location plates and bushings. With a vernier caliper set for hole center-to-center distance plus one-half the diameters of the respective locating pins, measurements are made over the pins of any pair of bushings. A light tapping of one bushing plate permits locating to the final thousandth or less.

To assure uniform location on a run of castings or work pieces, adjusting blocks and screws are provided which may be positioned appropriately around the outside of the whole assembly.

The Micro-King Borlocator, made by Steel Tools Inc., Cleveland, may be used for inspection fixtures as well as production jigs. A master assembly of bushings and pins set up as a multiple plug gage will permit inspections of center hole locations. Relationship of hole location to outer edges of work pieces may be checked by the adjusting or positioning blocks.

Location plates are chrome plated and precision made in straight, parallel, and square shapes. They may be assembled end to end, side by side, or end to side. To assure accuracy and rigidity, interlocking plate grooves incorporate a half-wedge in cross-section so that mating of two plates forms a full wedge. Thus, contact area of any two locked plates is under compression.

Locating plates are mated or fastened together by locking clamps and screws. Clamps are designed so that as screws are tightened the clamping action exerts only compression, with no tendency towards a lateral shift. Therefore, accuracy of adjustment is not upset by final clamping action after exact positioning of one location plate in relation to another.

Location plate holes are at uniformly fixed and accurate center positions and accommodate drill bushing adapters, allowing a variety of bushing outside diameters and wall thicknesses to be accommodated at each hole position. An assortment of location plates with different bushing adapter hole sizes and spacings is included with the standard set. Hole center distances provided are said to be appropriate to many simple jobs where one location plate is used for locating a series of holes.

Two location plates can be clamped together and displaced laterally to provide an infinite number of hole center distances. Location plates are available with any hole size or center distances. To insure that sufficient holes for locking and clamping are available, regardless of jig assembly intricacy, an adequate number of tapped holes are provided for both bushing adapter lock screws and location plate clamping screws.

Continued

# Grinding Questions Answered

By Allen Steele, Manager, Dayton Grinding Wheel Division
SIMONDS WORDEN WHITE COMPANY

**This series of questions and answers is presented as a practical aid in the solution of many of the more common grinding problems. Readers are invited to send in their own grinding questions, without obligation of any sort. All questions will be answered by mail or in this column. No identities will be revealed if published.**

**18 Q.** *"We have a centerless job on a soft steel bar 2" in diameter and 30½" long. We had been using a wheel with a 4" face, 60 grain, medium hardness, and it did a good job. To increase production, we recently switched to a wheel with 8" face, same grain and grade, but we are having trouble with chatter. How can this be remedied?"*

**A.** As you did not make any mention of the blade, we are of the opinion that you possibly overlooked reducing the top angle of blade when you changed from a 4" to an 8" faced wheel and that this is the probable cause of the chatter. Assuming that the top angle of the blade was about 30 degrees with the 4" faced wheel, it should be no more than 20 to 25 degrees with the 8" face. The reason for this is that the side pressure against the blade increases with the width of the grinding wheel, for quite obviously an 8" faced wheel will exert a much greater pressure against the blade than a wheel with a 4" face. And when this pressure is too great, it tends to squeeze the work up and out of contact with the blade. By reducing the blade angle as suggested, the squeezing pressure is reduced and thus the cause of the chatter is eliminated.

**19 Q.** *"I enjoy reading your 'Grinding Questions Answered' very much. I have learned something from every series you've published. Do you have Dayton wheels for grinding carbide tipped tools on a bench stand grinder that uses 7" wheels?"*

**A.** For the roughing operation in grinding carbide tipped tools we recommend our C-60 G-14-V-14 (old marking 960 G-2V). For the finishing operation—C-120 G-14-V-14 (old marking 9120 G-2-V). I hope we may add your name to the long list of shops which now use these wheels.

**20 Q.** *"On thread grinding jobs when is it best to use a wheel with a vitrified bond? When is it best to use a resinoid bond?"*

**A.** There are a number of factors which may go to determine the selection of the grinding wheel bond for thread grinding. As a general rule a wheel with a vitrified bond is chosen where close tolerances are required in either the form or lead, for internal grinding, and in the case of worms where several cuts are taken with a light feed.

As for wheels with a resinoid bond, these are generally chosen for high production jobs, i.e., where the parts can be finished with a minimum of cuts, where the work speed is high, and where extremely close tolerances are not required.

**21 Q.** *"Is it a sign of improperly adjusted work guides when work finishes up with a 'barrel shape' in throughfeed centerless grinding?"*

**A.** In throughfeed centerless grinding, "barrel shaped" work can be caused by both the front guides and the rear guides being deflected towards the regulating wheel—or the latter may have a convex face.

**22 Q.** *"Are the stones in diamond dressing and truing tools always the same in respect to quality and shape?"*

**A.** No, diamonds in dressing and truing tools differ in both type and shape according to the use which is made of them. For small external wheels of fine grain and hard grade, ¼ to 1¼ carat octahedron shaped Brazilian stones are usually employed. For softer wheels octahedron shaped grey or brown stones can be used. Smaller grey and brown stones—⅛ to ¾ carat—with long natural points, are used for small internal wheels. Wheels used for thread and hob grinding call for stones that are long with natural points or sharp splinters. Gear grinding wheels demand the finest and most carefully selected brown or Brazilian octahedron shaped stones.

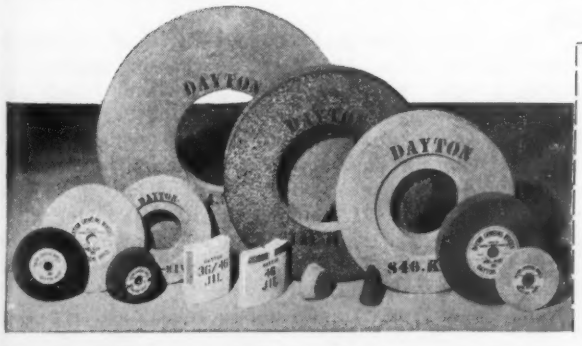
**23 Q.** *"After a wheel has once been balanced on a precision job, what is the technical reason for re-balancing it as its diameter wears smaller?"*

**A.** Although the modern grinding wheel is a precision tool and in the light of present knowledge is as "near-perfect" as we know how to make it, there are points of unequal density in all wheels. Because of this, a wheel may get out-of-balance as it wears down. Hence, the necessity for re-balancing it as its diameter becomes smaller.

*READY NOW...a guide to better grinding!*

**101 "Answers" to everyday grinding problems—indexed for quick, easy reference—will be sent FREE to anyone interested in better grinding practices. Just fill in and mail coupon below.**
**SIMONDS WORDEN WHITE CO., DAYTON 7, OHIO.**

**DAYTON GRINDING WHEELS**




SIMONDS WORDEN WHITE CO.,
714 Negley Place, Dayton 7, Ohio

Please send me Free Booklet "101 Grinding Questions Answered"

Name_____

Firm_____

Address_____

City_____ Zone____ State_____

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# INDUSTRIAL EQUIPMENT

## Roughness Meter

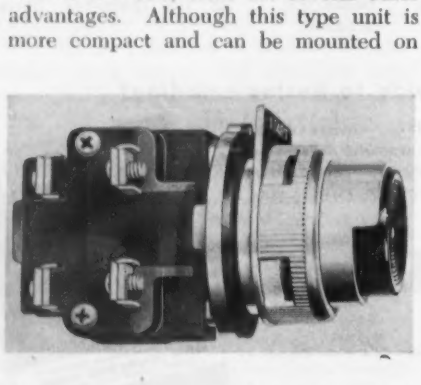
To enable control of the surface finish of high explosive caliber shells, Physicists Research Co., Ann Arbor, Mich., announces type CP roughness meter. It provides measurements of

average roughness on extremely coarse surfaces such as shells. Readings of the meter are directly in microinches of average roughness of the surface being measured. Meter and scale selector provide full scale ranges of 300, 1000 and 3000 microinches.

Tracer is designed for hand operation and built for use on rough shell surfaces. It has a blunt diamond point for tracing the surface. Diamond point is automatically self-adjusting to any curvature from 1½ in. OD to flat.

## Oiltight Pushbuttons

Designed primarily for group mounting on machinery or control enclosures, a new line of class 9001, type T oiltight pushbuttons is introduced by Industrial Controller Division, Square D Co., 4041 North Richards street, Milwaukee 12. While oiltightness is the principal feature of this line, there are several other advantages. Although this type unit is more compact and can be mounted on

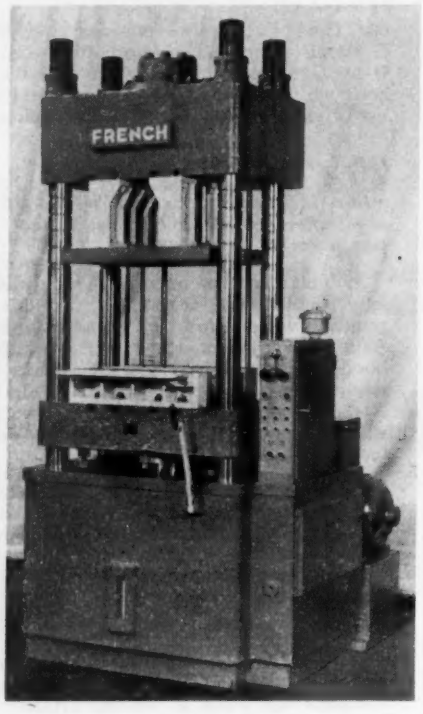


closer centers than previous types, there is no sacrifice of accessibility. All terminal screws can be reached with a screw driver without going in at an angle.

To install it, the unit is inserted through the panel and prevented from turning by a dowel. After the legend plate is slipped on, a thread ring firmly clamps the unit into position. As the operating mechanism and contact block are separate units, it is possible to obtain a combination to cover a wide range of circuit requirements with a limited stock of three types of operators and four types of contact blocks.

## Plastic Molding Press

A newly designed molding machine which is a combination compression and transfer molding press is offered by French Oil Mill Machinery Co., Piqua, O. It is a self-contained unit with hydraulic pumping equipment built into the bed of the machine. Each unit is complete with a fully automatic cycle controller covering various types of molding. Tim-



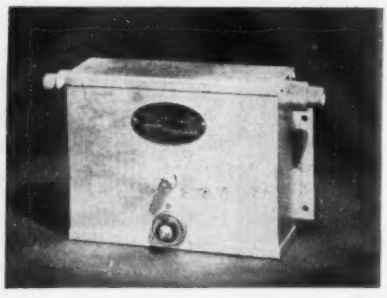

ing intervals and changes from one type of molding to another can be changed and adjusted instantly.

Presses are fast acting and are used in connection with high frequency preheating units to obtain maximum production speeds. The idle closing speed is 300 ipm. The 100 ton press is powered with a 5 hp motor and the 200 press with a 7½ hp motor.

## Ignition Transformers

Three new 115 v, 400 cycle ignition transformers, designed to provide a high voltage for igniting fuel in gasoline-fired, aircraft-cabin heaters and deicers are announced by General Electric Co., Schenectady, N. Y. Units are shielded and filtered to minimize radio interference over all wave bands from 110 kc to 200 megacycles.

Two of the transformers, with an output capacity of 6000 v each, are of single-secondary type. Third has a double secondary, rated 6000/6000 v for heaters with dual ignition or for two separate heaters with single ignition systems. Units are housed in plated steel cases and all coils are embedded in a



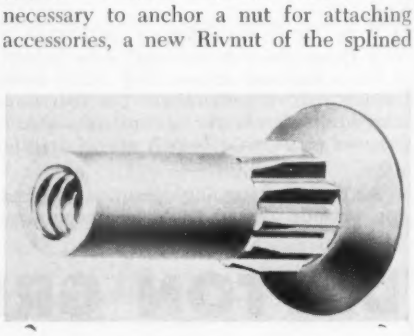
specially developed high melting point, moisture resistant insulating compound. They will operate over a wide range of ambient temperatures from minus 70 to 140 F at altitudes from sea level to 45,000 ft.

## Reset Type Starters

Two new manual reset type starters for 100 w fluorescent lamps, designated as COP-6 and COP-64, are announced by Sylvania Electric Products Inc., Salem, Mass. COP-6 is a two-contact starter while COP-64 is provided with four contacts for use in fixtures designed for another type of starting circuit. A push button manual reset facilitates normal lamp operation when faulty lamps are replaced.

## Splined Type Nut

For use in wood, plastics, leather, hard rubber or other material where it is necessary to anchor a nut for attaching accessories, a new Rivnut of the splined

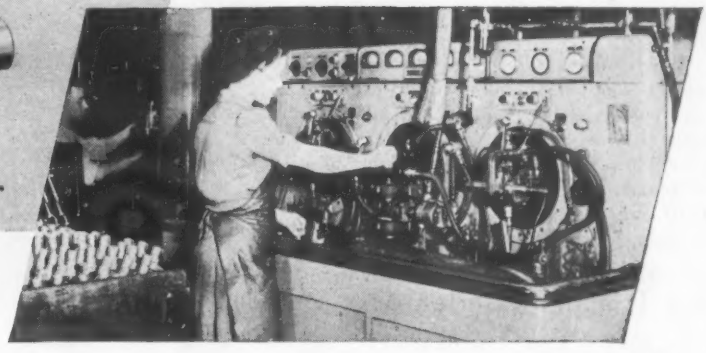


type is announced by B. F. Goodrich Co., Akron, O. In this nut, splines beneath the countersunk head supply resistance to torque, while the bulge or "upset" which forms below the end of splines furnishes tension resistance. Splined Rivnut is locked into place two ways. Internal threads left intact within the shank take an attachment screw for installation of accessories. It can be installed with same type tools regularly used for heading conventional types of

*(All claims are those of the manufacturer of the equipment being described.)*

# Double-Barrelled SHORT-CUT

## Briggs and Stratton tells how to cut costs ...improve quality with TOCCO



**Part:** Engine gear and shaft. Pitch diam. of gear 2", face 5/8". One of 18 parts which are hardened by Briggs & Stratton Corp. on one TOCCO machine.

**Short-cut No. 1.** Formerly hardened gear blank to machinable limit (32 R.C.) and cut teeth when hard . . . Now cut teeth in soft gear blank and TOCCO-harden teeth to 40-45 R.C. . . . Results: Gear-cutting is faster because metal is soft. Gear life is increased because of greater hardness.

**Short-cut No. 2.** Formerly press-fitted gear on shaft as separate operation . . . Now TOCCO shrink fits gear on shaft simultaneously with TOCCO-Hardening of gear . . . Result: Eliminates an operation.

TOCCO does the entire hardening and shrink-fitting operation in 15 seconds. Absence of scale and distortion makes the part perfectly accurate and uniform . . . ready for assembly.

The TOCCO machine, clean, compact and devoid of radiant heat and hot gases, is located in the center of the machine shop handy to machining operations.

TOCCO Engineers will gladly help you develop similar improvements in your metal working production. "Results with TOCCO," Bul. 14, free on request.

**THE OHIO CRANKSHAFT COMPANY • Cleveland 1, Ohio**

**TOCCO**

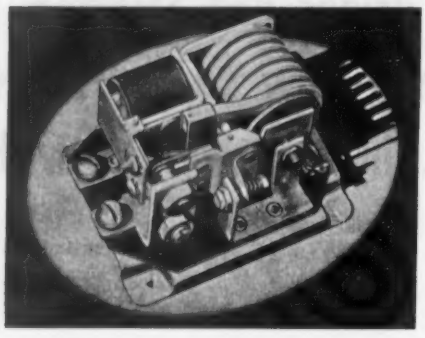
**HARDENING . . . BRAZING**
**ANNEALING . . . HEATING**

★

Rivnuts in metal. These must be adjusted, however, to accommodate the longer shank of splined type. Like other types, it is being made in three regular sizes, 6-32, 8-32 and 10-32 in aluminum or brass.

## Reverse Current Relay

Originally designed for use on auxiliary engine-driven power generators in Army tanks and bombing planes, type 9100 reverse current relay is offered

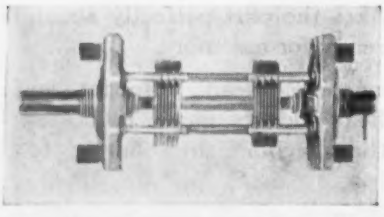


by R-B-M Mfg. Co., Division of Essex Wire Corp., Logansport, Ind. It is effective for any "tough" low voltage dc application.

The design of the device incorporates a magnetic latch which prevents accidental closing of armature and contacts due to vibration or heavy shock. Contacts are rated at 100 amp at 30 v dc maximum. Dimensions are: Width, 4 1/16 in.; depth, 3 7/16-in.; height, 2 1/16-in.; weight, approximately 1.6 lb.

## Air Trimmer Condenser

Comar Electric Co., 2701 Belmont avenue, Chicago 18, announces a new air trimmer condenser. The unit is available



either single or dual and has a ceramic mounting base with brass plates and mounting studs, cadmium, silver or nickel plated as required. Capacities range from 5 to 140 magnetomotive force with the following standard air gaps: 0.012, 0.015, 0.019, 0.030 and 0.045.

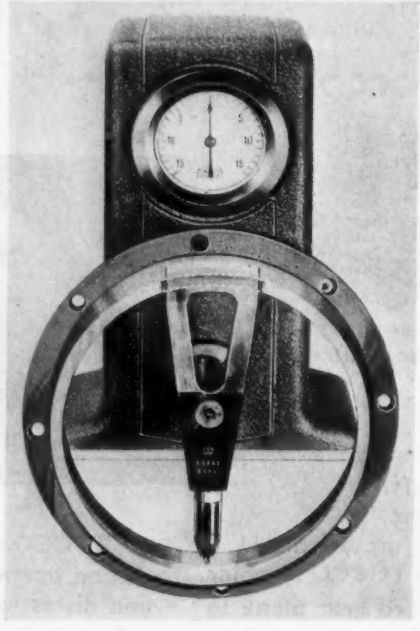
## Oscillator or Amplifier

Amperex 233 is specially suited for use as a Class C oscillator or amplifier for generating radio frequency power at frequencies up to 30 Mc. Use of two grid arms makes neutralization more convenient in the amplifier connection. They also permit cooler operation of the grid when the tube is used at higher frequencies either in a self-excited oscillator or power amplifier.

General characteristics include: Filament voltage, 24 v; current, 70 amp; thermionic emission, 16 amp; amplification factor, 52. Direct interelectrode capacitance: Grid to plate 24 uuf; grid to filament, 22 uuf; plate to filament, 1.5 uuf. This unit is offered by Amperex Electronic Corp. Inc., 79 Washington street, Brooklyn 1, N. Y.

## Hole Checker

A new method of gaging the inside diameter of a large bearing housing to vary close tolerances is shown by the illustrated application of the hole checker offered by American Gauge Co., 172 Bayard street, Dayton 1, O. A special sizing plug was developed with the upper part of the plug finished to exact radius of inside bearing housing. Lower part carries the gag-



ing head which is calibrated for high and low limits of accuracy. Contact point is highly polished norbide.

By using this type sizing plug, work can be checked for size, taper and out-of-round condition on large diameters. The hole checker is air operated and set with high and low limit master ring gages. Tolerance is 0.0005-in.

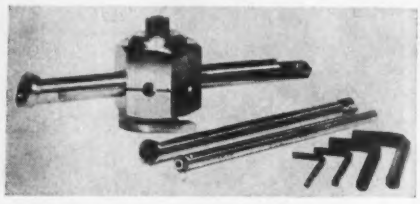
## Self-Contained Oven

Designed for laboratory and pilot plant use, a compact and self-contained oven is introduced by Industrial Oven Engineering Co., 11621 Detroit avenue, Cleveland 2. Sizes of oven working space range from 3 x 3 x 3 ft to 6 x 6 x 6 ft, in increments of 1 ft and special sizes are furnished to specification. Temperatures range up to 900°F with a differential of plus or minus 2°. This type of oven is usually furnished with electrical heating equipment, but is designed to use any type of fuel. In each case, the heating equipment is contained within the oven shell.

Oven is designed particularly for precision experimental work in drying, baking, evaporating, polymerizing, aging and heat treating, especially in cases where highly volatile solvents are used.

## Tool Holder

Shearcut Tool Co., Bellingham, Wash., announces a new type boring and cutting tool holder for use with their boring and turning tools. It is made in five sizes to accommodate lathes and screw machines from 10 to 36 in. swing. Each tool holder

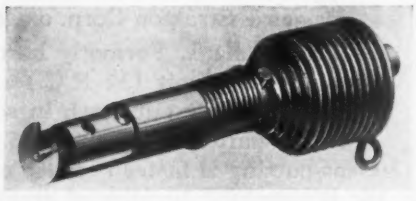


is provided with three boring bars, one which is arranged for turning in the smaller sizes. In the larger sizes two bars are arranged for turning as well as boring.

The device is boxed and complete with three boring bars, six Shearcutter bits, three wrenches for the cutter bit holding screws and wrenches for boring bar holder. Working, operating, and regrinding instructions are enclosed with each tool holder.

## Rivet Remover

A new tool to remove rivets quickly without enlarging the hole or distorting the skin is offered by Topflight Tool Co., Towson 4, Md. The defective rivet is instantly removed and a new rivet of the same size installed without distortion



of the sheet. Guides, chucks, drills are eliminated. A two way bucking bar is provided with each rivet remover.

Standard models remove ⅛ and 5/32-in. rivets. Special models are available for any size rivet. The remover is attached to a standard automatic rivet gun. The pulsating action operates the rivet removing tool without effort on the part of the operator.

## Power Control Tube

A new 15,000 v thyratron power control tube providing split cycle control of high power for heating uiits and radio transmitters is announced by Lamp Division, Westinghouse Electric Corp., Bloomfield, N. J. For electronic equipment designers, the thyratron WL-678 makes possible smooth and instantane-

**Looking for ways to improve your Product?**

# Try *American* FLEXIBLE METAL HOSE and TUBING

WOULD YOU LIKE to make your product more convenient, safe or economical to install or operate?

Then look into the possibilities offered by American Flexible Metal Hose and Tubing.

Sturdy, leakproof connections of this material have improved literally thousands of types of products and equipment... from heavy machinery to small accessories. Illustrated are three examples... on each, flexible metal tubing is used to excellent advantage, yet for an entirely different purpose.

Find out where flexible connections in your product or equipment could better compensate for movement of parts, vibration and misalignment ...or where gases, liquids or steam could be conveyed more easily or safely.

Flexible metal assemblies are usually easy to order and install. If *your* needs are unusual, our Technical Department can probably help.

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**OF THE AMERICAN BRASS COMPANY**
General Offices: Waterbury 88, Connecticut
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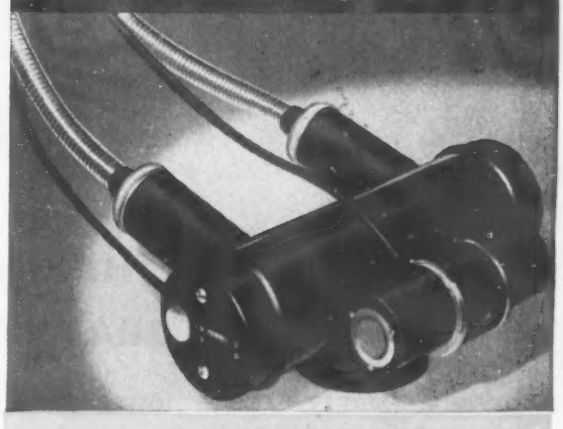
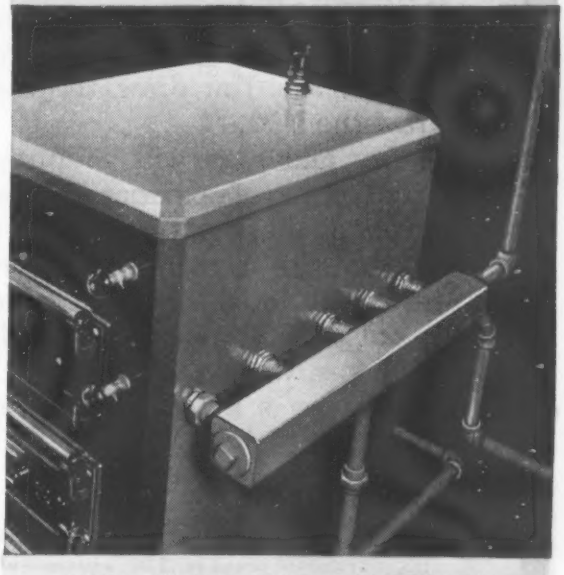
*In Canada:* ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

**Keep Faith With Your Fighters and Yourself!**
**Buy War Bonds for Keeps**

**FLEXIBLE EXTENSION FOR INHALATOR**
Through use of American Flexible Metal Tubing on this medical appliance, the vapor stream is directed as desired without moving the whole unit.



**PROTECTING X-RAY MACHINE CABLE**
Interlocked Stainless Flexible Metal Hose used to reinforce end of electric cable and prevent wiring failure.

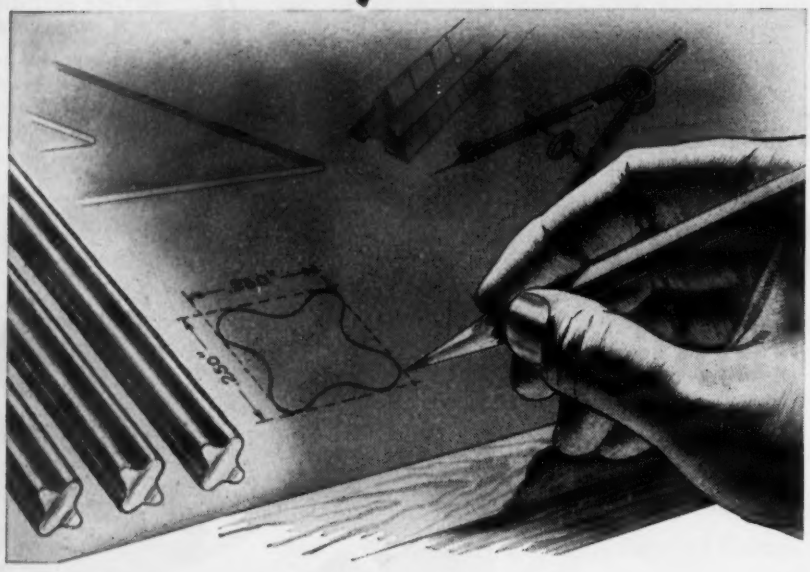


**BOILER—"HEADER HEATER" CONNECTIONS**
Installation made quickly and easily through use of American Seamless Flexible Bronze Tubing connections.

ANACONDA

*American Metal Hose*

# PAGE *Shaped* WIRE



## YOU DRAW THE *SHAPE* . . .
## PAGE CAN DRAW THE *WIRE*

Certainly PAGE is now drawing wire in many shapes—triangles, rectangles, octagons, hexagons, keystones, ovals, half-rounds, many other hard-to-describe special shapes. If you have use for shaped wire in the manufacture of your product, you are not limited to standard shapes. You draw the *shape*—PAGE can draw the *wire*.

Yes, and PAGE will go further than that. From years of experience, PAGE has learned much about the economical application of shaped wire to manufacture. PAGE offers you the benefit of this experience in finding ways to cut your production costs through the use of shaped wire.

For wire or information about wire—get in touch with Page!

★ ★ ★

**Specifically, PAGE Shaped Wire is made in sectional areas to .250" square—widths to 3/8"—of carbon or stainless steels.**

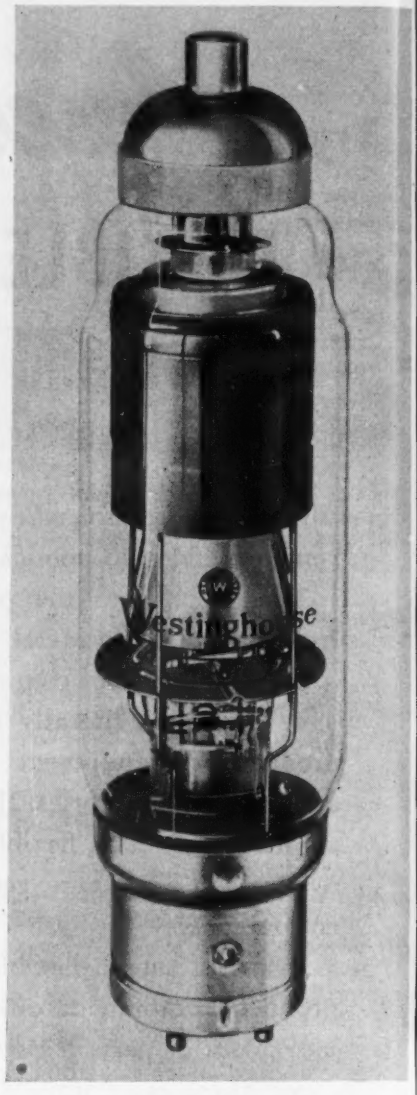
ACCO

TRADE MARK

**Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.**

**PAGE STEEL AND WIRE DIVISION**
**AMERICAN CHAIN & CABLE**


ous power control from 0 to 100 per cent load; simplified automatic load control; high speed automatic overload protection; low space and weight requirements and low power requirements. The grid-controlled mercury vapor rectifier tube is designed to combine the high voltage characteristics of a kenatron, control qualities of a thyratron and efficiency of a phanotron.

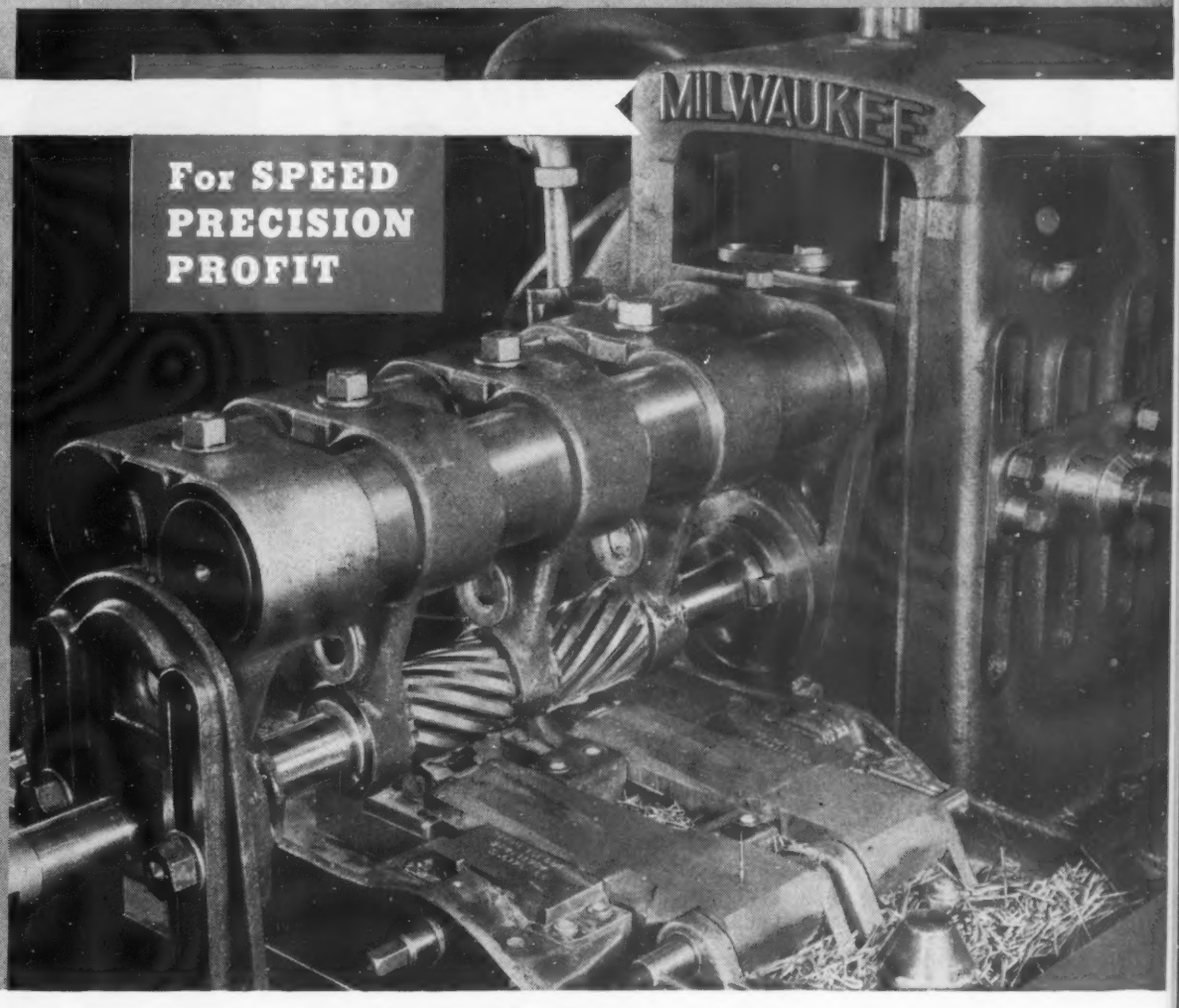


## Elevating Ladder Tower

A new Multi-Purpose elevating ladder tower is announced by Universal Fittings & Scaffolding Co., Zelienople, Pa. The tower is elevated and extended by a hand-operated winch, self-locking at any extended height. It has a 360° turning radius for manual or automatic operation and has a variable inclination from 45 to 75°.

The ladder is made in three sections, locked in place by continuous steel guides operating on sleeve type bronze roller bearings. The standard tower opens to a 35 ft 2 in. maximum working height when at a 75° angle, with a minimum working height of 22 ft 8 in. when at a 45° angle. Fully extended height of unit itself is 38 ft. There is a 5 ft 10 in. lap of the middle section of the ladder over the

# YOU CAN SAY THAT AGAIN — "PUT IT ON A Milwaukee"



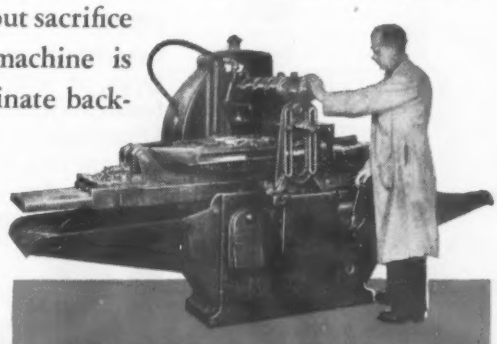

This heavy contour milling operation on a 1248 Milwaukee Simplex Milling Machine illustrates the rigidity of the machine itself. Using a rise and fall fixture the helical plain milling cutters removed ⅛ inch to 3/16 inches of stock from a steel forging. Ample cutter support is provided by the outer arm brace and the four arbor supports.

Often called "production type milling machines", the Milwaukee Simplex Series machines are designed for strength, compactness, and rigidity to withstand the strain of continuous quantity production.

Spindle construction is such as to provide greater range without sacrifice of rigidity. Basically designed for climb milling, this machine is equipped with an adjustable nut and ground screw to eliminate backlash in both directions of the table. Workpieces, ordinarily difficult to hold, are milled at faster feeds, with smoother finish and increased cutter life.

*Write for new descriptive Bulletin B20 giving complete details on the Milwaukee Simplex and Duplex Series of Milling Machines.*

Over-all view of the Milwaukee Simplex machine used on the above milling operations.



**KEARNEY & TRECKER CORPORATION**
MILWAUKEE 14, WISCONSIN

*Milwaukee Machine Tools*

# Morton's SALT TABLETS

**NOW AS FAMILIAR AND NECESSARY AS THE FIRST AID STATION**

In the middle thirties salt tablets were a novel idea. Today practically all leading industrial plants wouldn't think of eliminating either salt tablets or first aid stations. Both are essential — the one to help prevent accidents, the other to repair them.

When workers sweat, their bodies lose essential salt. This loss causes Heat-Fag, inalertness, fatigue, heat prostrations. Accidents increase. Production goes down.

Morton's Salt Tablets at every drinking fountain provide an easy, simple, effective way to restore this vital salt lost through sweat. The cost is less than a cent a man per week.

In salt tablets, as with other grades and types of salt, Morton is the recognized leader. Order Morton's Salt Tablets and Dispensers from your distributor or directly from this advertisement. Write for free folder today . . . Morton Salt Company, 310 S. Michigan Ave., Chicago 4, Illinois.

**MORTON'S DISPENSERS**

They deliver salt tablets, one at a time, quickly, cleanly—no waste. Sanitary, easily filled, durable.

800 Tablet size - - $3.25

**MORTON'S SALT TABLETS**

Morton's Salt Tablets are available either plain or with dextrose.

Case of 9,000, 10-grain salt tablets - - - - - - $2.60

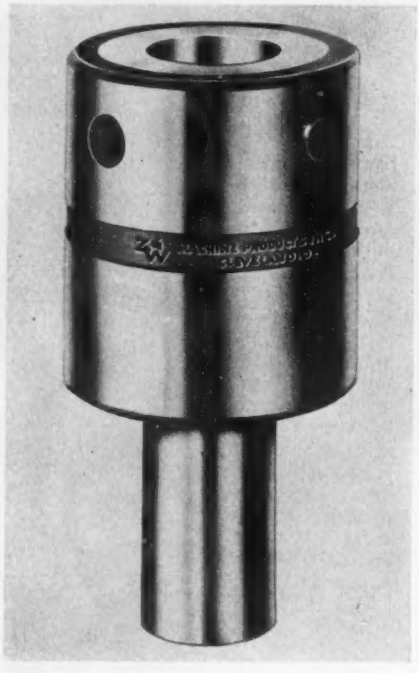
Salt Dextrose Tablets, case of 9,000 - - - - - $3.15

**MORTON'S SALT TABLETS**


lower section. Top section has a 4 ft 8 in. overlap on center section. A folding 24 x 30 in. work platform is at the top of ladder tower with an adjustable tubular guard rail. A trap door permits easy access to work platform.

## Tap Holders

Releasing type tap holders, announced by Champion Sales Co., 2832 East Grand boulevard, Detroit 14, permit production tapping to aircraft limits on both automatics and turret lathes. Because of the design, rigidity, positive drive and precision construction of these tap holders, first thread out is always a full thread. Release point is accurate and tap rotates freely on release, giving positive depth control. Blind holes can be bottomed with minimum risk of tap breakage; and tap withdrawn without damage to threads.



All working parts are made of alloy steel, heat treated and finished to tenthousandths limits. Multiple jaw clutch design gives positive drive and instant release and minimizes wear. Designed for use on automatic machines and turret lathes, these holders can be used on practically any type of tapping machine.

This tool was developed by Z & W Machine Products Inc., Cleveland. They are available for right and left hand tapping, in sizes for ¼ to 1½-in. taps.

## Safety Guards

New safety guards offered by Wright-Austin Co., 354 West Woodbridge street, Detroit 26, are completely transparent to allow full view of the machine and work without hindrance to any kind of operation. Sparks, metallic particles, splashing liquids and the like are curtained by an invisible, chip proof barrier.

Guards are made from a heavy gage plastic material which is as clear as

WHAT can we *do* about Johnny and the thousands of other boys who are returning from war disabled . who have already sacrificed so much? Must these boys sacrifice also the heritage for which indeed they fought . . . the right to be independent, free; the right to prepare for and *work* at a good American job of their own choosing? That's what these lads most want! Not soppy sympathy! Not the dole!

Unquestionably, this is the nation's No. 1 obligation. It *cannot* be solely a government obligation. It is the prime responsibility of every industrial and business executive in every company large and small, in towns big and little, to give these boys their chance to become self-supporting citizens, proud to be able to take full advantage of their American heritage.

Like a good many other concerns, Cooper-Bessemer conducts a special, carefully-planned apprenticeship and employment program for disabled veterans, enabling these boys to become full-fledged "journeymen" with a well-rounded background of specialized study and training. First in Ohio to adopt such a plan, we have had ample time to prove that it works out to mutual advantage. To put it mildly, the boys are eager . . hungry for success . . and exceptionally capable.

Perhaps a detailed explanation of our successful plan would be helpful to you in shaping up a program exactly suited to your own particular conditions. It is yours for the asking. In any case, you can, if you will, help Johnny to *forget* his gun.

★ ★ ★

The inset above shows a group of handicapped war veterans in classroom study at Cooper-Bessemer's Mount Vernon, Ohio, plant. These boys, discharged from Crile Hospital at Brecksville, Ohio, and other U. S. Veterans Administration Hospitals, also receive actual shop practice as part of progressive apprenticeship and employment program.

★ ★ ★

*Additional information on this subject, covering proposed programs and successful experience in many types of industry, may of course be obtained from various sources such as the Retraining and Reemployment Administration, local and state Veterans Service Committees, War Apprenticeship Training Service, the Disabled Veteran Rehabilitation Committee of the Associated Business Papers in New York City, and others.*

THE
**Cooper-Bessemer**
CORPORATION
Mt. Vernon, Ohio • Grove City, Pa.

BUILDERS OF DEPENDABLE ENGINES FOR 112 YEARS

# "Our BAKER TRUCKS have proven that they can "take it" and DO THE JOB AT LESS COST"

## CASE HISTORY OF BAKER TRUCKS IN A LARGE FORGE PLANT

May 11, 1945

Baker Industrial Truck Division
Baker Raulang Company
Cleveland, Ohio

Gentlemen:

You recently delivered to us another Baker lowlift platform truck, a 5-ton model, equipped with power unit. This truck, like our others, is being used to handle hot forgings, dies, cut steel and numerous other handling jobs in our plant.

Our first Baker truck was purchased in 1937 to replace one unit of another make of truck which used direct gasoline engine drive. The Baker truck soon proved to us that the flexibility of control and ruggedness of construction built into these machines was what we needed.

We are now 100% Baker equipped and our choice has been well justified. These trucks receive extremely hard service as we have many ramps, short turns and rough surface conditions over which they must operate with capacity loads. Our Baker trucks have proven that they can "take it" and do the job at less cost.

Yours very truly,

*Forging stock en route to furnaces from yard storage*

*Forgings from hammers delivered to inspection department*

**The above letter, written by the vice president of a midwestern forge plant, typifies the kind of service to be expected of Baker Trucks. The company decided to standardize on Baker soon after the first purchase in 1937. As the letter states, the choice has been well justified.**

**The trucks have enabled the plant to maintain stepped up production in spite of manpower shortage. Tonnage figures are almost impossible to calculate. All forging steel is handled seven times: receiving to storage, to hammers, to inspection, to annealing, to cleaning (pickling or sand blast), to storage and to shipping.**

***The new Baker Catalog No. 52 describes many case histories in a wide variety of installations. Call your nearest Baker representative, or write for your copy today.***

*Finished forgings carried to and from yard storage in skid boxes*

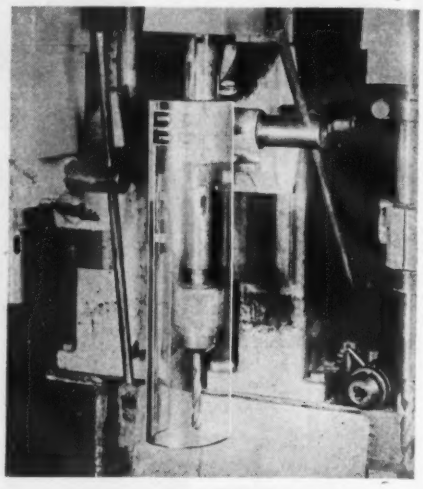
*Carrying skid box of forgings up ramp to shipping platform*

**BAKER INDUSTRIAL TRUCK DIVISION**
**of The Baker-Raulang Co.**
**2167 WEST 25th STREET**
**CLEVELAND, OHIO**

***In Canada: Railway & Power Engineering Corporation, Ltd.***

**Baker INDUSTRIAL TRUCKS**

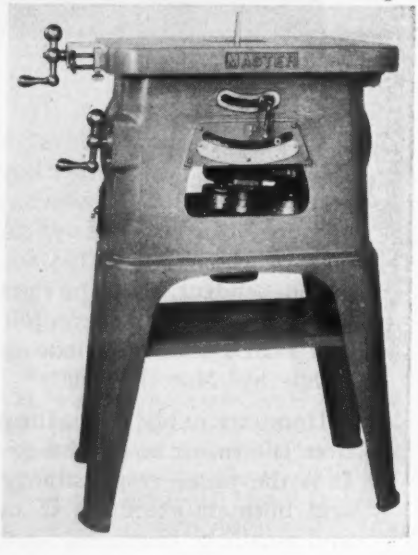

window glass but has toughness and high resiliency. Its properties enable it to be sawed or drilled as easily as wood, yet molded into practically any shape or



contour. Guards are available in standard sizes and can be supplied in size or shape to fit any machine.

## Spindle Machine

A spindle machine which can be used either with a wide variety of milling cutters to machine wood and soft metals, or with various sizes of abrasive sleeves as a spindle sander, has been developed by Kindt-Collins Co., 12651 Elmwood

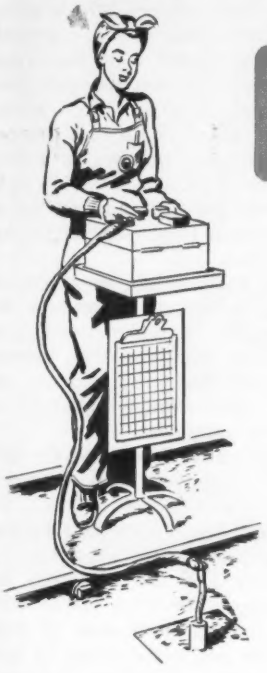



avenue, Cleveland 11. Its spindle oscillates for sanding work and is nonoscillating for milling work.

The machine is particularly useful in duplicating small or large quantities of any given piece of wood or metal and is used with various special fixtures. It uses standard milling cutters of various shapes, diameters and tapers, and abrasive sleeves ranging from ¼ to 1 in. in diameter, attached to spindle by means of collets. Spindle speeds are 3500, 5000 and 7000 rpm, developed by a ½ hp, 3500 rpm motor. Spindle tilts to 45°. All controls and adjustment handles are accessible and degrees for tilting the tool are marked 5/32-in. apart on a polished plate.

*Number 10 of a Series:* "Looking at the 5 essential things you never see in electrodes!"

# *Unforgettable* EXPERIENCES!



ADDED TOGETHER, the working years of a faithful group of 369 National Carbon Company employees exceed 70 *centuries* of unforgettable experiences! *And unforgotten manufacturing experience* . . . with "National" carbon and "Acheson" graphite electrodes for electric furnaces. These loyal workers have been associated with us from 15 to 35 years each.

Now in its 60th year, National Carbon looks at the record of this group, and the many hundred others who have contributed so much to its history.

Some have improved plant machinery, or perfected its use. Others have developed formulas to yield stronger electrodes, or to give them lower electric resistance. Still others have helped customers use electrodes more effectively. A complete list of such achievements would be long indeed!

We truly believe that this unmatched manufacturing experience, extending over six decades, is of utmost importance to the quality of furnace electrodes . . . one of "the five essential things you never see" in them but which are basic to our products. The other "unseen" essentials are: Selection of raw materials, manufacturing control, customer service, and continuing research. Your inquiries are cordially invited.

NATIONAL CARBON

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The registered trade-marks "National" and "Acheson" and the "National" and "Acheson" Seals distinguish products of National Carbon Company, Inc.

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In Canada: Canadian National Carbon Company Limited, Toronto 4, Canada

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PAT'D.

## REMOVES WELDING FUMES

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**No longer need your employees inhale welding fumes. A Ruemelin Fume Collector solves the problem, quickly and efficiently. It produces a powerful suction that draws out noxious gases, smoke and heat *at the source*. Guards employee health, resulting in less welder fatigue, therefore greater plant output. Has many exclusive features: (1) Clears shop air with minimum loss of building heat. (2) Exhaust snout can be positioned instantly and conveniently. (3) Covers maximum welding territory, vertically, horizontally and by circle swing. (4) Shipped completely assembled, easy to install. Thousands of Ruemelin Fume Collectors now serving war industries everywhere. 9 ft. and 15 ft. sizes available.**

***We gladly offer engineering service for your fume collector installation. Write for Bulletin 37-C.***

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*MANUFACTURERS AND ENGINEERS*

SAND BLAST AND DUST COLLECTING EQUIPMENT, WELDING FUME COLLECTORS

A 4709-2/3


## Purchasing Stainless Steel

(*Continued from Page* 100)

man to appreciate the market for a high-priced, low-tonnage product when he was accustomed to think in terms of high tonnage.

In our first purchase of chrome alloy steel pipe, we encountered this difficulty. We found it to influence our subsequent purchases greatly. A tube mill, after some discussion, accepted our order for a sizable amount of pipe, indicating, however, a fairly long delivery, which under the circumstances was to be expected. Within the time condition on the order, the mill informed us that the pipe was run and samples could be taken as required by the order. With that original order, we initiated a practice of ordering each length of pipe or tubing ¼ to ½ in. longer than the use required so as to provide coupons from each length for inspection of test.

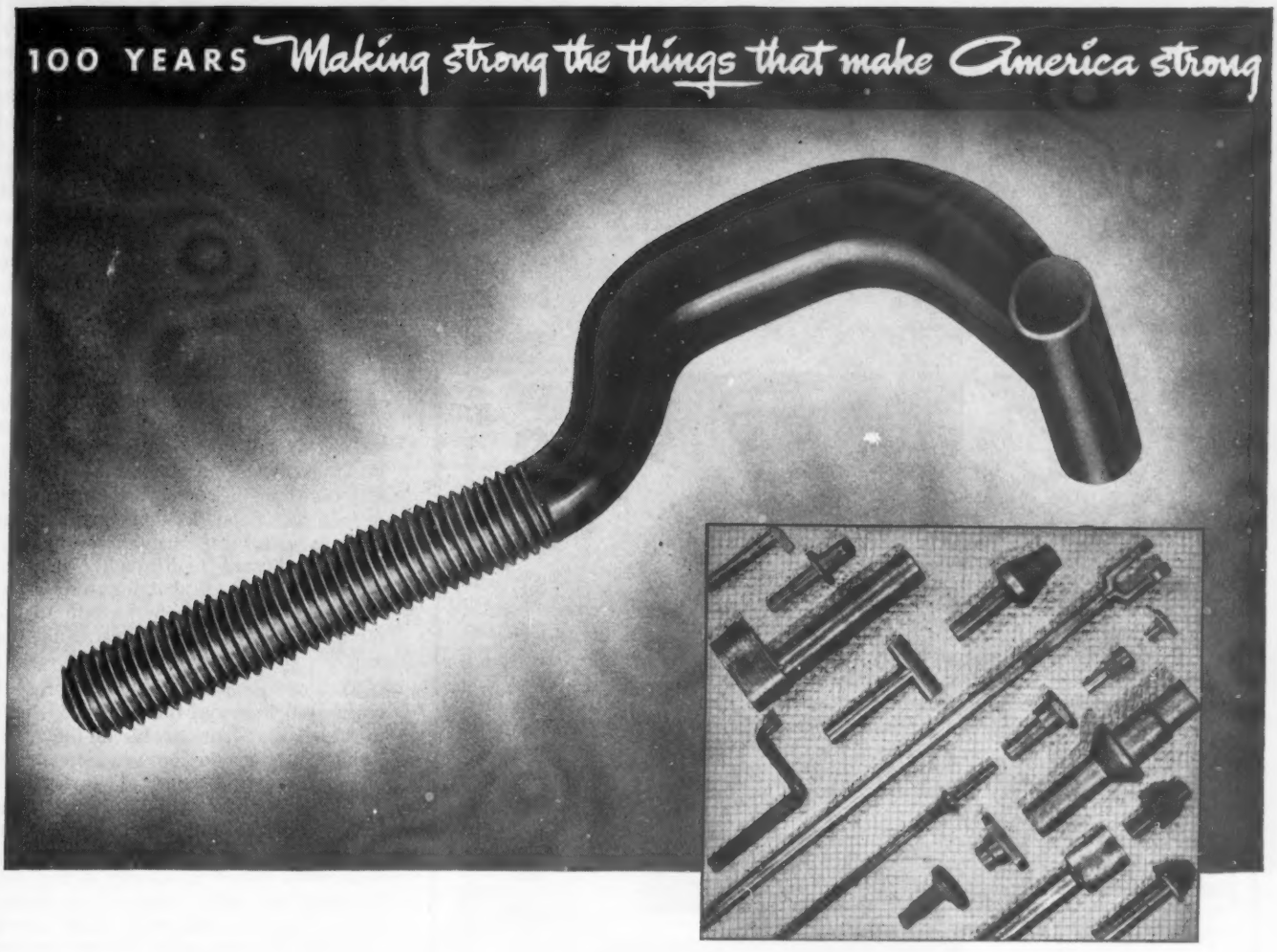
Also, in the early orders, we inspected all pipe and tubing to determine the physical condition of the material, providing inspectors who would be present at the mill tests and who actually examined for production imperfections such as out of roundness.

**In the Order under Discussion,** the mill tests proved satisfactory and the mill was instructed to take and submit the samples. After being subjected to our accelerated tests, the pipe proved to be of high quality and the mill was instructed to ship. We were elated with the success and apparent ease of production on this, our initial order, in face of the predicted difficulties indicated by other representatives of the steel industry.

Two weeks went by and no shipping papers arrived. A wire brought the information that the order was not completed. Puzzled by the reply in view of the known facts, we sent a representative to the mill. Within a few hours he reported that he found the pipe in the finishing department *being laboriously polished inside and out.* When asked for an explanation, the mill explained that any product which ran over a dollar a pound should look the part. The polishing operation was immediately abandoned as we wanted pipe and not hand rails. *This was our introduction to the influence of the tonnage principle of the steel mills on chrome alloy production.*

It has been a long journey from those days but now it can be pointed to with pride that at least one of the tube mills has a research laboratory where air conditioning and careful handling play as important a part in critical analytical and chemical composition of the tubing as the microbe fighting laboratories of the food industry.

Our first experience with what would be called in the chemical or food industry a "microbe-infected steel" was also with an early production of plates. The first plates run in this particular mill while not entirely satisfactory in the mill test due to the tendency toward an




## COLD-FORGED . . . on bolt-making machinery . . .

*for strength, accuracy, appearance and economy*

The same method that is used so successfully to manufacture RB&W EMPIRE Bolts was used to produce these special parts . . . with maximum strength, accuracy and appearance, and at lowest cost.

Cold-forging on RB&W equipment increases tensile strength, intensifying the grain while preserving the flow lines of the metal . . . and provides an automatic inspection of the material. Headed parts are formed with extreme accuracy, for this modern machinery is operated to very close tolerances. Threads are perfect. Appearance is unmistakably that of a quality product.

Costs are lower, because RB&W's equipment operates at very high speeds, and, in cold-forging, the scrap waste is virtually eliminated.

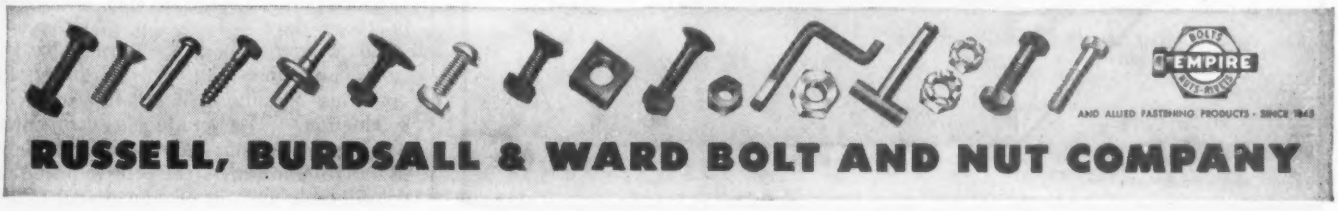
### THE LONGEST EXPERIENCE IN AUTOMATIC COLD-FORGING

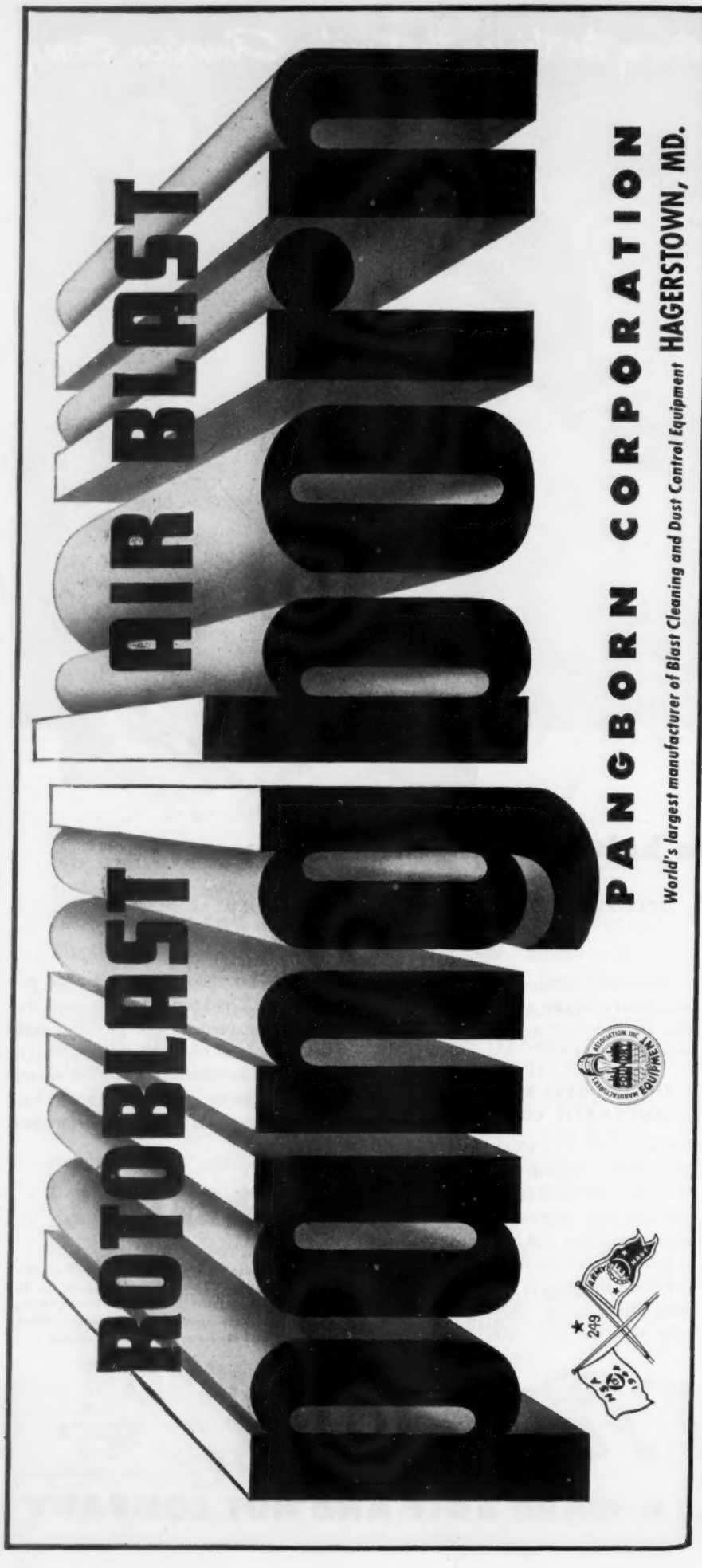
This is RB&W's 100th year. The history of this company is also the history of automatic cold-forging, for it introduced the original automatic cold-heading machine and has since pioneered in many respects to improve the quality and lower the costs of fasteners and other parts which can be cold-forged.

In planning new parts, consider the many metal shapes which can be produced by cold-forging and also that RB&W's experience and facilities make it your logical source of supply. At present, wartime commitments have monopolized those facilities; meanwhile, keep in mind the advantages of this method.

**RB&W**

Russell, Burdsall & Ward Bolt and Nut Company. *Factories at:* Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. *Sales offices at:* Philadelphia, Detroit, Chicago, Chattanooga, Los Angeles, Portland, Seattle . . . with the industry's most complete, easiest-to-use catalog.






uneven gage, running particularly heavy in the center sections, gave an otherwise satisfactory physical and accelerated test and was released to the fabricator. In those days, we were in the habit of ordering sheet and plate also in larger dimensions than required to accommodate the procurement of samples for physical as well as corrosion tests. The heavier gage increased the price on the invoices on a per pound basis but we were not inclined to be unreasonable on that score, figuring we in turn were faced with corrosive conditions and the heavier gage would result in longer life.

Much to our surprise, the first pieces of apparatus placed in operation quickly developed the holes from what we later learned to call a "tubercular" condition. We hurried out to the mill to consult with the company's operating department. A long discussion developed nothing, as a close check of manufacturing procedure indicated high quality material should result. Late that following afternoon, we all went into the mill to observe the rolling of a few plates for our order.

The mill had an old, badly rusted, corrugated iron roof through many holes in which the slanting rays of the afternoon sun shone to throw an eerie light on the somber interior. The dirt floor was deep in iron oxides, finely divided by years of constant tramping and every step and every movement of material and equipment stirred up clouds of this dust to which was added larger pieces shaken loose from the roof with each jarring pass through the rolls. These particles passed down through the spotlight of the sun's rays in swift, erratic courses, their final resting place to be on the floor or the hot plates in process.

All in the little party that afternoon quickly became conscious of *this dangerous atmospheric influence* on those precious plates passing backward and forward through the rolls.

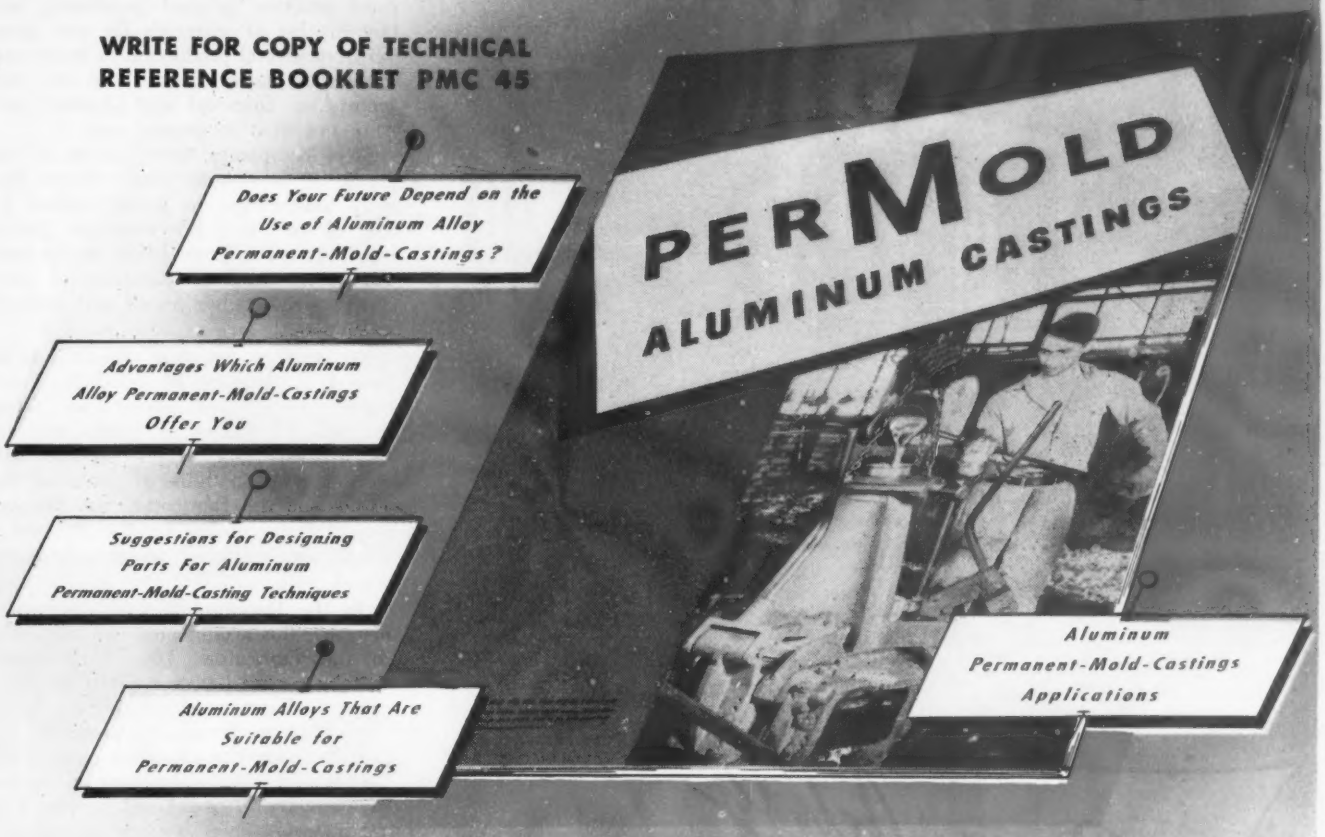
Probably we shall wait a long time until high cost alloy steel will be subjected to the great care exercised in the products of the food and chemical industries. Today, however, we are becoming aware that alloy steel is almost as susceptible to dirt-laden air as the products of the latter industries.

**For a Number of Years,** we continued the practice established with our initial orders, purchasing directly from the steel companies the alloy steel required for fabrication of our apparatus and equipment. This included everything down to the last plate, sheet, bar, bolt, nut, washer, rivet and welding rod. The practice has since been abandoned, but we found it a necessary precaution then for many reasons.

Uniformity in analysis was important in those days before the adoption of standard compositions for given types of steels and the lack of uniformity in operating conditions in the few mills in production. The producing companies were critical of our seeming over-anxiety to obtain uniform steel. It required a considerable amount of educational effort

# How To Avoid Misapplication of Aluminum Permanent-Mold-Castings

**WRITE FOR COPY OF TECHNICAL REFERENCE BOOKLET PMC 45**


Does Your Future Depend on the Use of Aluminum Alloy Permanent-Mold-Castings?
Advantages Which Aluminum Alloy Permanent-Mold-Castings Offer You
Suggestions for Designing Parts For Aluminum Permanent-Mold-Casting Techniques
Aluminum Alloys That Are Suitable for Permanent-Mold-Castings
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Aluminum Permanent-Mold-Castings Applications

### A Permold Engineering and Metallurgical Review brings you:

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2. **Design suggestions,** resulting from hundreds of applications of permanent-mold-castings, to guide you in obtaining unusual savings available through the use of high strength aluminum alloys and lighter weight sections.
3. **Recommendations covering correct combinations of physical properties** required to meet given service conditions; and how to utilize the excellent physical properties and heat treatment potentialities of aluminum alloys to protect your product against failure.
4. **Estimates of cost-reducing possibilities** which may be realized through the use of permanent-mold-castings and metal from re-melt sources.
5. **Technical facts** resulting from comparisons of materials, processes, and costs usually overlooked and unappreciated except by those of broad specialized experience in the highly skilled art of permanent-mold-casting on a mass production basis.

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THE DESIGNING ENGINEER who would avoid the pitfalls of misapplication that often penalize development work will find in this new technical reference booklet on permanent-mold-castings useful and reliable information on how to obtain the utmost of every advantage available in permanent-mold-castings. Practical suggestions for designing parts for aluminum permanent-mold-casting techniques, plus a brief treatise on aluminum alloys that are suitable for permanent-mold-castings, provide guidance for design engineers, metallurgists, production and management executives who must determine when, where, and how to employ permanent-mold-castings and to obtain lowest piece price for each part at the point of assembly. This booklet presents 27 years of accumulated engineering and metallurgical experience and 24 years of permanent-mold-casting experience that is also available through a Permold Engineer or Metallurgist. Ask a Permold Engineer to bring you a copy of this booklet or write for your copy today.

## THE PERMOLD COMPANY

**830 WEST LIBERTY STREET • MEDINA, OHIO**

*28 Miles Southwest of Cleveland*

FAST ECONOMICAL HEAT-TREATING HIGH SPEED STEEL TOOLS, DIES and PARTS . . . .

Quick Acting Johnson Furnaces

**By concentrating heat where needed and insulating against loss with high temperature refractory, JOHNSON Furnaces reach operating temperatures FASTER to save time and gas. Designed primarily for heat-treating high-speed steels, they are equally efficient for hardening any steel tools, dies, or small metal parts. Write today for literature giving complete specifications. JOHNSON engineers will help you select the type and size which meet your heat-treating requirements.**

No. 120 Hi-Speed Heat-Treating Furnace. Reaches 1500° in 5 minutes. 2300°F. in 30 minutes. Firebox 5 x 7¾ x 13½. $129.50 F.O.B. Factory.

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No. 130A Hi-Speed Heat-Treating Furnace. Features counter-balanced door opening upwards. Firebox 7¾ x 13 x 16½. With 4 or 6 burners for temperatures 1400 to 2400°F. 4-Burner Unit shown. . . . $295.00 F.O.B. Factory. 6-Burner Unit $325.00 F.O.B. Factory.

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2250°F. in 30 minutes from a cold start!

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Please send me Free Illustrated Catalog of Johnson Quick Acting Furnaces.

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on our part to acquaint the many individuals in the several companies with our problems in corrosion.

Occasionally, it was necessary to start all over again when one company would drop out of the field and a new one would enter. A fabricator would follow his usual practice in steel purchasing and buy his list of materials for any given job from several production or warehouse sources of plates, sheets, bars, etc. Mill reports on chemical and physical tests were not then in general use.

Steel companies were critical of the credit of fabricators from whom they were accustomed to accept orders for tons of steel at a few cents per pound, but hesitated to grant credit to the same fabricators for large quantities of material that was higher priced and critically examined.

We, in turn, found it expedient to assure final delivery of satisfactory and highly priced equipment to follow through all phases of production and fabrication. Our orders on the mills were based on bills of material furnished by the fabricator, but the burden of responsibility for the delivery of satisfactory material to the fabricator rested with ourselves.

**In the Handling** of highly expensive material, this arrangement was agreeable to the fabricator. The fraternization thereby set up between producer, fabricator, and consumer brought an appreciation of each other's problems that contributed to the education of interested parties and the development of the now high quality of metal and furthered the feeling of mutual respect prevailing in the several industries.

In the education of the fabricator to the necessity of observing our demands for quality production, we originally went so far as to furnish the early fabricators with lock boxes in which the welding rod for our job was carried each morning from the tool room to the job by our resident inspector, and he, in turn, locked the box at the end of the day's work, put the key in his pocket and returned the box to the tool room for safe keeping. The box itself was marked with the job number. The mill, in turn, maintained a constant contact with the fabricator to assist him with his fabricating difficulties.

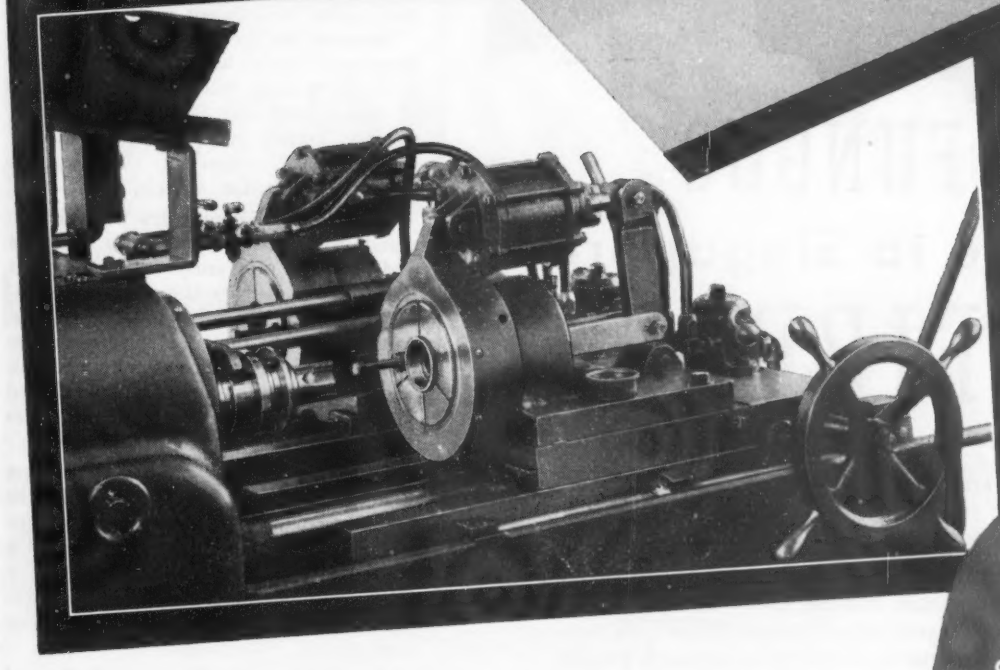
As the old timers will recall, we also were much plagued in those early days when riveting was still in general practice, upon coming into the shop in the morning, to find the rivet heads popped off our tanks like so many buttons on a vest enclosing an oversized chest.

All material except the rivets (and later welding rod) for a given job could be obtained from the steel companies where uniformity of production could be controlled. Unfortunately, rivets had to be obtained from a separate source. When we succeeded in obtaining the co-operation of the rivet producing companies (fortunately they were not long following) by placing their orders in turn for bar stock with the same controlled production and even furnishing

KEEPING AHEAD OF THE TIMES

# MURCHEY

## Now Offers Special Applications for No. 22 DOUBLE SPINDLE Tapping Machine



● Sizes and depths of threads for this particular application are as follows: Size 3″ Straight Pipe Thread — Depth 5/8″ in C. R. Steel W. D. 1010. Two hundred and fifty pieces per hour on two spindles. No. 22 Double Spindle Tapping Machine is capable of various other applications. Write us your requirements.

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*Write* also for information on Collapsible Machine Taps; Self-opening Die Heads; Thread Milling; Shell Tapping and Roller Pipe Cutting-off Machines.

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## *from* Seattle to Singapore

## *because of* FIBREEN

A few years ago, a certain exporter faced the situation of leather hides arriving in China seriously damaged from fungus.

Various methods of protection were tried — until one day he hit upon FIBREEN. This important industrial paper not only prevented fungus from developing in transit — but also created other typical FIBREEN savings. Crating was eliminated, cargo space lessened, weight cut down, freight charges lowered, and claims reduced.

And in spite of exposure to rain, heat, salt air, humidity, and rough handling, FIBREEN was resold and used for protecting other materials stored on the China Coast.

Hundreds of manufacturers are finding in FIBREEN the answer to many of their shipping problems. It is enabling them to save time, material, freight, and handling charges, as well as give their products unmatched protection. Why not investigate its possibilities in your business.

Sisal fibre reenforcement for strength—special asphalt for water-proofness—kraft paper to make it scuff-proof—sealed by heat and under pressure to produce Fibreen.

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*Manufacturers of* SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

bar stock to them on our own orders, our headaches ceased.

Later, as the art of welding advanced and became under the codes an acceptable procedure in fabrication, we had less trouble with the quality of the weld rod as we early insisted on its production by the same source as the balance of the material to be fabricated. Our greatest difficulty from the latter procedure was to educate the welders into a conscientious observance of the rule that like materials should be welded with like rod. Of course, welders could weld metals with a dissimilar rod and took righteous pride in the fact. They were not long getting the idea but until the steel companies' metallurgists and the consumer learned the value of stress relieving, X-raying and other attendant procedures, development of satisfactory welding methods was hesitant and backward.

Here, again, problems of heavy capital investment were bravely faced by the fabricator confronted by the demands of code construction for stress relieving. The installation of X-ray equipment and the erection of furnaces by the fabricators to meet the new demand occasionally cost more than original capital investment in the company.

**Research by the Steel Companies** also developed steels which could be successfully welded without the necessity of stress relieving. The use of these steels is limited only by the severity of the corrosive action of the products to be used in the vessels.

The chemical companies in their demands for steels to meet their corrosive and erosive problems, realized earlier than other industries the value of stressing purity of products in selling campaigns for new materials placed on the market, both as entirely new materials and as competition for older established markets. Corrosion of equipment was recognized as a source of impurity.

Reverting back to our old problem in the purchase of pipe and tubing, the ease with which our first order for pipe was produced gave us no hint of the subsequent problems which did develop in the production of this important material in the construction of modern chemical plants.

Due to low yields and high cost of production, our first source of supply soon abandoned the production of seamless alloy pipe and tube.

It should be mentioned here that we and other consumers of this commodity were slow in contributing to the development of welded seam pipe, mainly because of the slow development of the art of welding.

We were constantly in the field at this time seeking a new source for the production of seamless tubing and our persistency was soon rewarded. Another firm became interested in our requirements and for a time produced highly satisfactory pipe and tubing. However, it was much discouraged, as was our previous source of supply, by the tendency of the pipe and tubing to burst

# Your Product May Change after V-Day

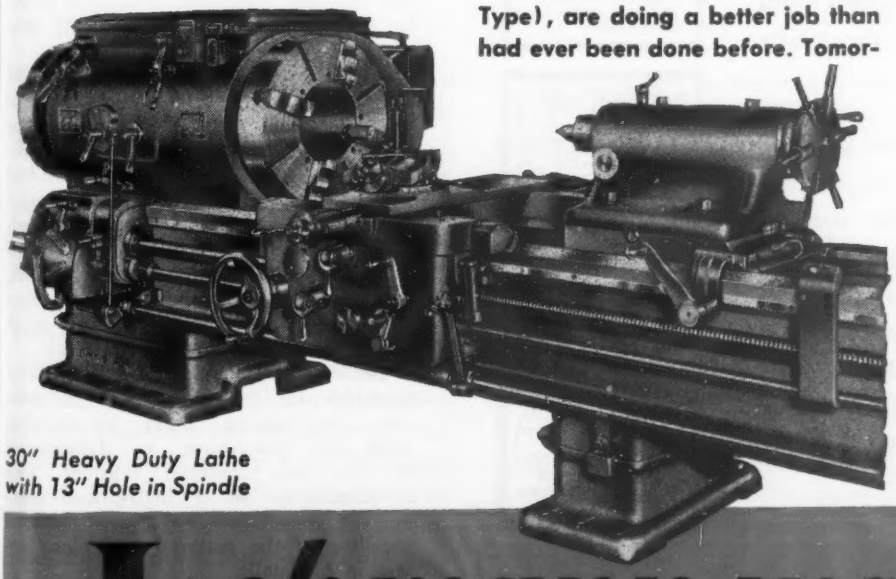
# BUT-

# HYDRATROL LATHES

(LARGE HOLLOW SPINDLE TYPE)

## Will Continue to Increase Production-Lower Costs!

**Today, in hundreds of war plants, under all sorts of conditions, HYDRATROL LATHES (Large Hollow Spindle Type), are doing a better job than had ever been done before. Tomorrow, on the peacetime production line, HYDRATROL LATHES will continue to increase production—improve work, cut costs. Let us show you how HYDRATROL LATHES can solve your present machining problems and at the same time prepare your plant for efficient, profitable peacetime production.**



*30" Heavy Duty Lathe with 13" Hole in Spindle*

**FIVE SIZES—18" TO 36"**

**Small . . . . 18" up to 7 1/4" Hole**
**Medium . . . . 24" up to 12" Hole**
**Large . . . . . 27" up to 13" Hole**
**Large . . . . . 30" up to 14" Hole**
**Large . . . 36" up to 16 1/2" Hole**
*(Standard type lathes, 16" to 36")*

# Lehmann MACHINE CO.

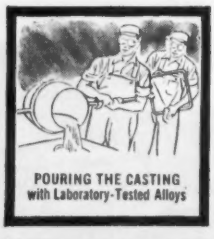
CHOUTEAU AT GRAND ★ ST. LOUIS 3, MISSOURI

**In** ordering your permanent mold aluminum castings from Acme you supply the blueprint, and Acme does the rest. Your casting is poured in an Acme mold that is made from an Acme pattern. You can rely upon an Acme mold to have proper gating and risering, permitting pouring at correct temperatures. Acme's centralized responsibility is particularly important in permanent mold work, where one mold may affect the quality of thousands of castings.

**Acme** made tools and patterns even before it made castings. And today, Acme engineering experience unites with advanced foundry practice to give you the finest possible results. For permanent mold castings with finer grain, greater strength, and maximum dimensional accuracy—and machined ready for assembly—secure the facts on Acme Castings today. Recommendations and quotations submitted promptly.

PATTERN MAKING
Backed by a Quarter Century of Experience

MAKING THE MOLD
Controlled by Advanced Engineering Standards


POURING THE CASTING
with Laboratory-Tested Alloys

CASTINGS FINISHED
to Exact Dimensions Ready for Assembly

ACME *Aluminum Alloys, Inc.*
Formerly Acme Pattern & Tool Co., Inc.
DAYTON 3, OHIO
PATTERNS · TOOLS · ALUMINUM CASTINGS · ENGINEERING


open along a straight seam after the drawing operation was completed and frequently even for a considerable time thereafter. For no apparent reason, tubing which the night before appeared to be physically perfect would be found split open in the morning, or the ruptures would occur in shipment.

Again our source of supply was eliminated, this time chiefly because the company was taken over by another organization and the new company was not then alloy-minded. It has been contended that if this small mill had been allowed to fight their problem through, it would have found the solution much sooner, as it seemed to be nearer a solution than most others were sometime after this event.

For a long time, it was our policy as with other alloy items in order to insure uniform quality, to purchase the pipe billets from the steel mill and furnish them to the pipe mill for drawing. Thus, we had a close insight into the problem of yields.

Other companies became interested and then although the problems continued, they were slowly solved one at a time to reduce eventually the yield loss to a point where the operation was profitable. In the meantime, enough companies were producing to meet, after a fashion, our requirements together with the growing demands of the chemical industry. It was common practice during this period for the larger purchasers to consult with each other and allocate the production of a certain mill among themselves to suit their requirements.

As the confidence we held in our own sales, production and operating policies was yielding greater sales, our production was increasing beyond the point where small sized screwed joint pipe and tubing was adequate to carry the operating loads and a demand for larger sized tubing, beyond the conventional screw joint, was developing. Our first adventure into the fabrication of flanged joints for seamless alloy tubing brought discouraging results.

**Pipe Fabricating Companies** accepted our orders for fabricated alloy pipe when our plans for a considerable step-up in production was projected, confident of their ability to Van Stone the pipe with only a little more difficulty than they were experiencing with high carbon steel pipe. As usual, we were furnishing all the pipe, flanges, bolts, gaskets, etc. This arrangement was acceptable to the pipe fabricator, as it had been with the plate fabricator.

These agreements with the fabricators operated in the nature of a subsidy encouraging them to develop skills and procedures in fabrication of the new material without loss to themselves in a high-priced metal. It encouraged a very careful handling of the material and close attention to details.

We bespeak high praise for all fabricators who worked with us in the early stages of alloy fabrication, through the statement that our losses under these arrangements were almost nil in com-

*Logan* A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES

This Lathe Bed is Another Reason for *Logan* ACCURACY

THE long lasting accuracy of Logan Lathes is due in large part to the construction of the Logan Lathe bed. The extra heavy, sturdy ribbed, special analysis castings are alloyed to obtain the finest lathe bed characteristics, and are designed for sections of even thickness to reduce internal strains. How these rugged castings are planed, aged, milled, machine scraped, finish-milled, precision ground, and checked is too complex a story of accurate and efficient workmanship to be fully told here. The important aging period which follows the rough cut, for example, allows more than adequate time for maximum development of any latent tendencies to distortion. In milling, nine formed cutters perform nine heavy milling cuts simultaneously in a single pass to bring the ways to within .0015" of finished specifications. Then the mechanical scraping, the finish milling, and the final precision grind bring the ways to within .0005" of parallelism over their entire operating area. It is care like this, not only in making the bed, but in building the complete machine, that makes the Logan Lathe dependably accurate in the tool room and in high-speed production. Ask your Logan dealer, or write direct for catalog information on all models of Logan Lathes.

No. 820 Quick Change Gear Lathe

No. 840 Quick Change Gear Turret Lathe

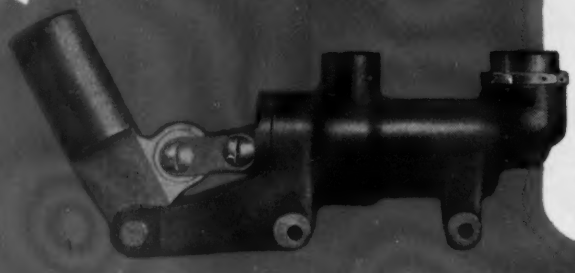
**SPECIFICATIONS common to all Logan Lathes:** Swing over bed, 10½", Bed width across ways, 6-15/16", Bed length, 43⅛", Size of hole through spindle, 25/32", Spindle nose diameter and threads per inch, 1½"—8, 12 Spindle speeds 30 to 1450 r.p.m., size of motor ⅓ or ½ h.p., 1750 r.p.m.; Preloaded precision ball bearing spindle mounting; Drum type reversing motor switch and cord; Precision ground ways, 2 prismatic "V" ways, and 2 flat ways.

**LOGAN ENGINEERING CO.**

CHICAGO 30, ILLINOIS

E-1

# Pesco PRECISION HYDRAULIC HAND PUMPS

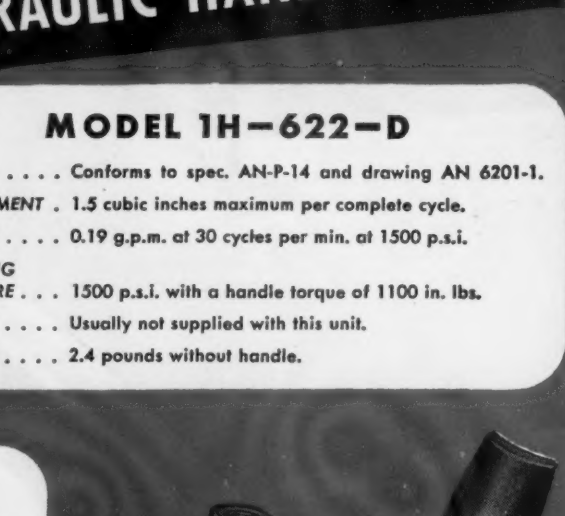


## MODEL 1H—622—D

*TYPE* . . . . . Conforms to spec. AN-P-14 and drawing AN 6201-1.
*DISPLACEMENT* . 1.5 cubic inches maximum per complete cycle.
*CAPACITY* . . . . 0.19 g.p.m. at 30 cycles per min. at 1500 p.s.i.
*OPERATING PRESSURE* . . . 1500 p.s.i. with a handle torque of 1100 in. lbs.
*HANDLE* . . . . . Usually not supplied with this unit.
*WEIGHT* . . . . . 2.4 pounds without handle.

## MODEL 1H—437—F

*TYPE* . . . . . Hand operated, double acting differential piston.
*DISPLACEMENT* . 1.6 cu. inches maximum per each complete cycle.
*CAPACITY* . . . . 0.20 g.p.m. at 30 cycles per min. at 1000 p.s.i.
*OPERATING PRESSURE* . . . 1000 p.s.i. with 50-lb. force exerted on handle.
*HANDLE* . . . . . Detachable, 18⅞ in. long, 50° total movement.
*WEIGHT* . . . . . 2.5 pounds with handle.



## MODEL 1H—437—K

*TYPE* . . . . . Hand operated, double acting differential piston.
*DISPLACEMENT* . 1.6 cu. inches maximum per each complete cycle.
*CAPACITY* . . . . 0.20 g.p.m. at 30 cycles per min. at 1000 p.s.i.
*OPERATING PRESSURE* . . . 1000 p.s.i. with 50-lb. force exerted on handle.
*HANDLE* . . . . . Detachable, 18⅞ in. long, 50° total movement.
*WEIGHT* . . . . . 2.76 pounds with handle.

● Featuring new standards of volumetric and mechanical efficiency, PESCO Hydraulic Hand Pumps will do a better job wherever small quantities of fluid are to be pumped at high pressure. Unusually compact and lightweight, these precision pumps are self-lubricating . . . built with spring-laden ball check valves for uni-direction fluid flow, and needle bearings to minimize operating torque.

In addition to these pumps, PESCO design and manufacturing skill extends through a complete line of air, fuel and hydraulic pumps . . . precision equipment that opens the way for more efficient use of Pressurized Power and controlled liquid flow. Descriptive literature available. Write, specifying the equipment in which you are interested. PESCO Products Co., (division Borg-Warner) 11610 Euclid Avenue, Cleveland 6, Ohio.

Division Borg-Warner

PESCO BORG-WARNER

In Precision Hydraulics, Fuel Pumps, Air Pumps, Related Accessories . . .
PERFORMANCE POINTS TO Pesco FIRST

# HELPFUL LITERATURE

## 1. Molten Metal Pumps

Ruthman Machinery Co.—4-page illustrated folder "Another 'First' by Ruthman!" describes Gusher molten metal pumps which handle lead, babbitt, solder, zinc and other alloys at temperatures up to 1000 degrees Fahr. and reduce accident hazard.

## 2. Material Handling Units

Revolvator Co.—Illustrated broadside "The Art of Piling for Modern Industry" covers line of portable elevators and accessories for moving, lifting, piling and stacking various types of raw material and finished products.

## 3. Synthetic Resin Products

Resistoflex Corp.—16-page illustrated catalog presents information on properties, characteristics and specifications of products made from compar solventproof vinyl resin. Articles covered include various types of hose, tubing, end fittings, industrial gloves, work aprons, mechanical molded goods, coatings, adhesives and paints.

## 4. Arc Welding Electrodes

Reid-Avery Co.—24-page illustrated booklet "Raco Arc Welding Electrodes" gives applications, welding procedure, welding codes, physical properties of weld metal, recommended current ranges and sizes of electrodes and welding rods for various types of work.

## 5. Automatic Control

Reeves Pulley Co.—6-page illustrated folder No. G-452 describes automatic hydraulic controls for synchronization of different machines and of separate sections of single machine, and maintenance of constant tension, uniform peripheral and winding speeds, uniform pressure, weight, liquid level, temperature and other variable elements.

## 6. Traveling Cranes

Reading Chain & Block Corp.—16-page illustrated bulletin "The Why and How of Faster Production" contains data on traveling cranes and unit parts such as crane trolleys, end construction, gear cases, bridge drives and cabs. Illustrations show cranes in use in various plants.

## 7. Electrostatic Coating

Harper J. Ransburg Co.—8-page illustrated booklet "Ransburg Electrostatic Painting Processes" describes electrostatic process for spraying, dipping, coating and detearing. Parts are shown in process and diagrams indicate principle.

## 8. Engineering Data

Riehle Testing Machine Div., American Machine & Metals, Inc.—4-page engineering chart No. A-389 includes tables on percentage reduction of area for tensile test specimens, hardness conversion chart for hardened steels, and table of circle dimensions, with diameters ranging from 0.001 to 1.000 inch in increments of 0.001 inch. Formulas and hardness conversion data are included.

## 9. Collets & Stock Pushers

Sheffer Collet Co.—20-page illustrated loose leaf catalog No. 45 gives specifications and prices of line of collets and stock pushers. Information is conveniently arranged by maker s name and type of machine.

## 10. Castings

Meehanite Research Institute of America, Inc.—127-page illustrated bulletin No. 22 is entitled "Stories of Meehanite in Industry." This is collection of articles about Meehanite castings which have appeared in various trade publications.

## 11. Lighting Equipment

Sylvania Electric Products Inc.—8-page illustrated "Lighting Products" bulletin contains comprehensive information about industrial, commercial, portable and inspection types of fluorescent fixtures. Data are given on fluorescent lamps, starters and lamp holders. Also described are incandescent lamps and fixtures.

## 12. Magnesium Castings

Superior Bearing Bronze Co.—4-page illustrated "Lighting Products" bulletin contains facts for design engineers on design and application of products employing this metal. Comparative properties of magnesium and other structural metals are tabulated.

## 13. Air Compressors

Sullivan Machinery Co.—42-page full-color brochure "Modern Industrial Compressors" describes machines for furnishing compressed air for industry's heaviest demands. Complete details of machines and production facilities of company are outlined. Various types and sizes of compressors are described.

## 14. Finishing Method

Sturgis Products Co.—6-page illustrated folder presents details of Roto-Finish mechanical de-burring and finishing process for metal parts. This method can be used for grinding, de-burring, polishing, honing and coloring. Typical machines developed for application of process are described.

## 15. Turret Lathes

South Bend Lathe Works—12-page illustrated bulletin No. 901 presents specifications and other information on series 900 and series 1000 South Bend turret lathes. These machine tools are designed for high speed machining of small chucking and bar work requiring close tolerances. They are especially adapted to second operations.

## 16. Plastics & Stampings

Standard Products Co.—16-page illustrated bulletin "Standard Products" explains facilities of company in engineering and production of molded and extruded plastics and rubber parts, metal stampings, war materiel and window channel. Typical parts produced are shown.

## 17. Coolers

Ross Heater & Mfg. Co.—24-page illustrated bulletin No. 5322 covers types CP and CF coolers designed for continuous service for lubricating, cutting, quenching and transformer oil, hydraulic presses, engine jacket water, refrigerant emulsions, small vapor condensors and oil pump systems. Performance charts and dimension tables are included.

## 18. Rotary Pumps

Geo. D. Roper Corp.—32-page illustrated booklet "How to Solve Pumping Problems" contains discussion of steps to follow in selection of rotary pumps. General information and numerous technical data tables complete the publication.

## 19. Melting Furnaces

W. S. Rockwell Co.—4-page illustrated bulletin No. 411 covers oil or gas fired stationary and tilting type crucible melting furnaces for aluminum, brass, bronze, copper, gold, monel metal, nickel, silver and other nonferrous metals. Reverberatory melting furnaces are also covered.

## 20. Milling Cutter Checker

Michigan Tool Co.—4-page illustrated bulletin No. 471-44 shows features and applications of Model No. 471 hob and milling cutter resharpening checker which utilizes two standard indicator assemblies. Diameters up to 10 inches and spread between centers of 16 inches can be handled.

## 21. Resistance Welding

Sciaky Bros. — 8-page illustrated bulletin 204-A describes this company's "three phase to single phase" system for welding heavy gages. Technical discussion is based on article from STEEL. Four models of welders are shown and characteristics and uses are briefly covered.

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## 22. Bearing Selection

Shafer Bearing Corp.—6-page illustrated bulletin No. 652 is entitled, "How to Select the Correct Bearing in Machine Design." Line type selection charts simplify choice of single or double row bearings for given speed, radial and thrust load, and operating conditions.

## 23. Rebuilt Machine Tools

Simmons Machine Tool Corp.—60-page illustrated bulletin "The Simmons Way" shows company's facilities for engineered machine tool rebuilding. Modernizing of machine tools with Micro-speed drive and power rapid traverse is discussed. Designing and building of special purpose machines are described.

## 24. Acetylene Generator

Sight Feed Generator Co.—16-page illustrated bulletin 44-G describes Sight Feed acetylene generators for making welding and cutting gas as required. Simple and safe in operation, equipment requires only carbide and water. Typical installations are shown.

## 25. Phosphor Bronze

Seymour Mfg. Co.—8-page illustrated booklet presents sizes, specifications, tempers, tolerances, properties and uses of grades A, B, C, D and special free-turning phosphor bronze in sheet, rod and wire forms. Phosphor bronze welding rod is also covered.

## 26. Centrifugal Castings

Shenango-Penn Mold Co.—8-page illustrated bulletin No. 143 discusses advantages of ferrous and nonferrous centrifugal castings and presents chart of characteristics and applications of numerous types. Methods of manufacture are described and pictures of typical castings are included.

## 27. Metal Products

Schneider Metal Mfg. Co.—24-page illustrated booklet "The Schneider Way to Better Designed, Engineered, Fabricated Metal Products" discusses complete service available for fabrication of metal merchandising displays, sign erection equipment, industrial metal products and various types of component parts.

## 28. Dust & Fume Collector

Claude B. Schneible Co.—4-page illustrated folder No. 145 deals with type EC Multi-Wash dust and fume collector consisting of Multi-Wash collector tower, Multi-Louvre dewatering tank, Wear-Proof pump for recirculating cleansing liquid and suction fan. This model is portable and self-contained.

## 29. Rust Prevention

Shell Oil Co.—40-page illustrated bulletin discusses subject of rust prevention through use of Shell Ensis coatings. Typical problems are outlined and their solutions given. Features, range of application and types of rust prevention products are also described. Other data on protective coatings are included.

## 30. Convection Furnaces

Surface Combustion—4-page illustrated bulletin No. SC-122 is entitled, "Convection Heating in Surface Combustion Furnaces." Typical models and their application are described. Table gives Rockwell hardness versus drawing temperatures for SAE steels and their NE substitutes.

## 31. Honing

Micromatic Hone Corp.—8-page illustrated form No. AR-67 describes machine tools, fixtures, tools and abrasives which are used to generate finished surfaces in cylindrical parts. Specifications are given on new vertical Hydrohoner, as well as on Micromatic honing machines and tools.

## 32. Wire Working Machines

F. B. Shuster Mfg. Co.—4-page illustrated bulletin describes wire straightening and cutting machines with capacities of $\frac{1}{8}$-inch to $\frac{1}{4}$-inch. Various models are shown and mechanical advantages are discussed.

## 33. Refractories

Richard C. Remmey Son Co.—52-page illustrated catalog contains valuable information concerning use of refractory products, refractory shapes and standard shapes, and includes estimating sheets and general information. Specifications, sizes and engineering data of use in applying refractory products are covered.

## 34. Boring Machines

Stokerunit Corp.—12-page illustrated catalog on "Simplex Precision Boring Machines" discusses advantages, operation, design and operating features, and electrical equipment employed in this machine tool. Specifications are tabulated for various sizes and models.

## 35. Portable Electric Sander

Sterling Tool Products Co.—4-page illustrated bulletin No. S-203 describes model 1000 portable electric sander which features Orbital motion. Abrasive grits are driven in $\frac{1}{8}$-inch orbits against work at rate of 5000 cycles per minute.

## 36. Gas & Oil Burners

Peabody Engineering Corp.—4-page illustrated bulletin No. 902 describes type M combined gas and oil burners which are available in full range of sizes and are suitable for heating boilers, industrial furnaces, power boilers and oil refinery furnaces. Fuel may be natural, refined or manufactured gas.

## 37. Threading Equipment

Murchey Machine & Tool Co.—42-page illustrated reference manual contains engineering and operating data on company's line of threading equipment. Die heads, taps, thread systems, conversion data and other information are included.

## 38. Manufacturing Locations

Dept. of Commerce, Commonwealth of Pennsylvania—24-page illustrated bulletin "Let Your Business Grow in Pennsylvania" explains factors which state offers to business enterprises. Power, raw material, taxes, skilled labor, transportation and other advantages are listed.

## 39. Flexible Metal Tubing

Pennsylvania Flexible Metallic Tubing Co.—Illustrated bulletins No. 90-C and No. 91 cover Penflex Weld high pressure flexible all-metal tubing and Penflex interlocked flexible metal tar and asphalt hose, respectively. Applications, design variations and specifications are listed.

## 40. Cutting Oils

Sun Oil Co.—64-page illustrated booklet "Cutting and Grinding Facts" describes various types of Sunoco emulsifying cutting oils. Case studies in various plants covering lathe work, milling, hobbing, drilling, grinding, pipe threading, lubrication and cold rolling are quoted.

## 41. Protective Coatings

Quigley Co.—6-page illustrated bulletin No. 379 describes Triple-A Mill White and Dairy White finishes. First is light reflecting coating which is adaptable for use in factories, warehouses, industrial and other buildings. Gloss, semi-gloss, flat and enamel undercoat types are available. Dairy White produces hard, high-gloss finish and under normal conditions will dry in 4 hours.

## 42. Steel Fabrication

Stacey Bros. Gas Construction Co.—44-page illustrated bulletin No. G-45 presents comprehensive picture story of fabrication and erection of gas holders, storage tanks, processing vessels and other structures. Production and erection facilities of company are shown in action.

## 43. Carbide Tools

Spe-D-Cut Tool Co.—28-page illustrated catalog No. R-20 on carbide-tipped cutting tools gives details on line of tool bits, boring tools, router bits, milling cutters, fly cutters, lathe centers and special tools. Engineering data are included to aid in proper use of carbide-tipped cutting tools.

## 44. Malleable Castings

Saginaw Malleable Iron Div., General Motors Corp.—48-page illustrated booklet entitled ". . . this is the story of our part in the war" shows typical parts produced, company facilities and personnel, and comparative scenes of processes in World War I and II.

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# Men, Metals, Machines and Micrometers

You can have these four essentials of production and still not make a usable or salable part, yet proper application of all four results in a superior product.

Take our case, for example. *MEN* — We have the men, craftsmen indeed. Over a thousand years of accumulated experience and skill. *METALS* — Furnished to your exact specifications, forged, cast or rolled. Our engineers are available to make metallurgical recommendations. *MACHINES* — No shop is better equipped, gear shapers, hobbers, generators, thread millers, mills, lathes, etc., in endless variety. *MICROMETERS* — Used intelligently in our plant, as are dial indicators, gages and other precision devices, to check the accuracy of every gear.

*The Illinois Gear trademark on your gear means it's a "Five Star Gear."* ★ Material double-checked. ★ Cut by a highly skilled craftsman. ★ Required accuracy inbuilt. ★ Double-inspected after completion. ★ Delivery as promised.

Our Catalog No. 39 will help you — it covers gears, their types, use and manufacture.

ILLINOIS GEAR & MACHINE CO., Chicago (35), Ill.

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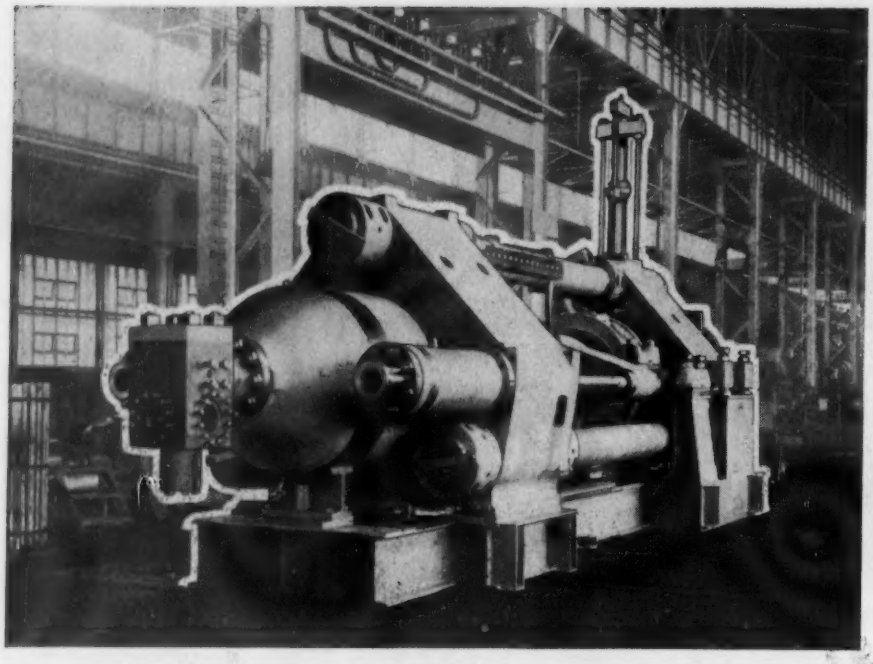
ILLINOIS GEAR & MACHINE COMPANY



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## have *Super-Standard Features*

With capacities ranging from 850 to 5000 tons, Schloemann Presses are designed to extrude all extrudable shapes, in all metals that lend themselves to this process. This, of course, is standard. But Schloemann exceeds the standard in several exclusive and highly important respects.

For instance, the patented method of supporting platen and container holder permits thermal expansion in all directions without losing alignment with those parts of the machine that remain cold.

Three-phase induction heating of the container affords ample and uniform heat under close control, a feature of utmost importance to long container life and quality of the extruded product.

Independent movement of mandrel from press stem enables the piercing of billets that have been cast solid. This avoids the oxidized skin encountered with hollow cast billets and provides tubing with smooth internal surfaces.

These and other super-standard features set up a definite Schloemann advantage. Their tangible results are economy in operating and maintenance costs, greater flexibility and diversity, convenience and long life.

If you have a problem or special need, or if there is a size or type of extrusion in which you are especially interested, Schloemann Engineers offer their fullest assistance.

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parison to the volume of work done in the shops. We did have some losses which were embarrassing as only that particular material required for the job had been processed, making it necessary to produce more material or take a chance in obtaining material of like composition from another source.

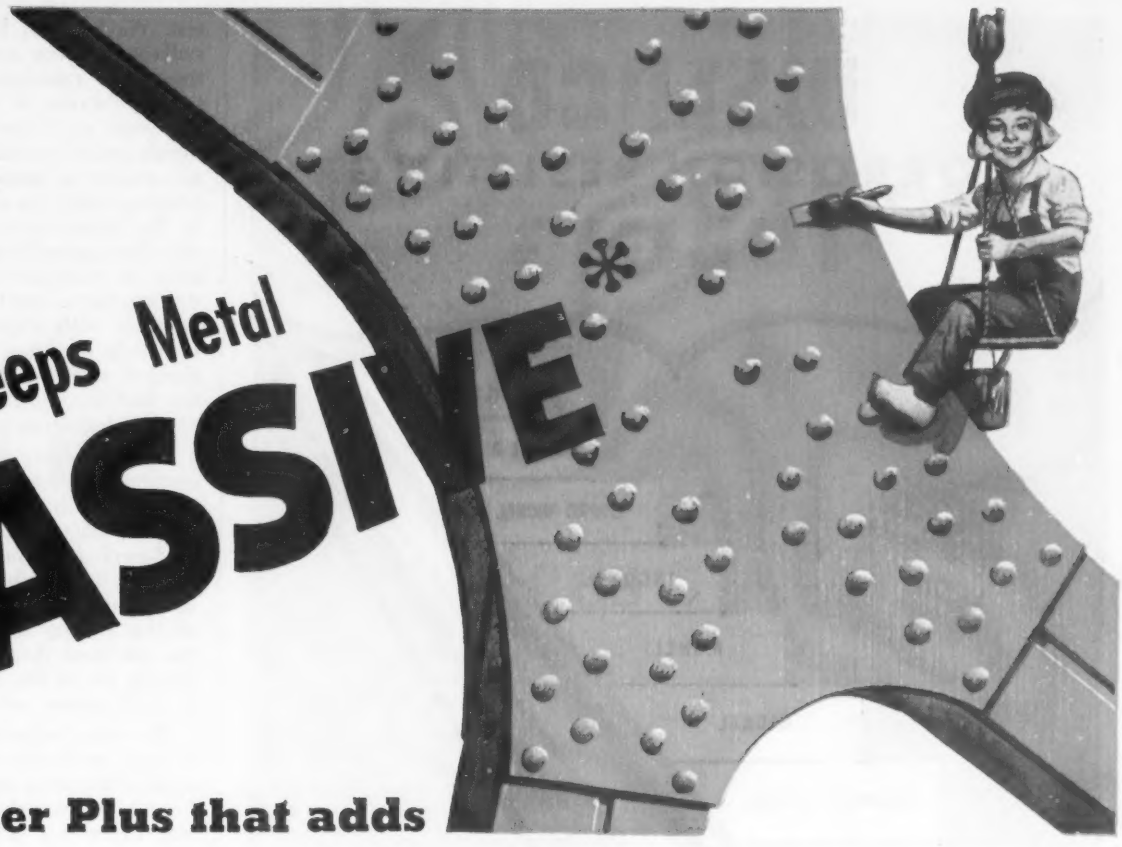
Some difficulty was encountered in this respect but it was never insurmountable. No ill-feeling occurred on either side and almost all the firms who passed through these trying times with us are still fabricating for us, our mutual admiration and esteem unaltered. All of these firms have contributed commendable accomplishments in the production of capital equipment for the ordnance plants. Their work has been a valuable contribution to the war program.

Back again to our experience in fabricating Van Stone type joint alloy pipe. We had ordered large quantities of pipe, confident that the pipe fabricators would have a minimum of difficulty.

**With the Delivery** of the first pipe, the fabricator, after several unsuccessful attempts to Van Stone, refused to proceed with the order, largely because he was handling material which was not his own. A visit to his plant and a study of the problem showed that the pipe would split in several places on the flange when the flange was rolled beyond a certain point. We determined to experiment by cutting a number of 18-in. lengths and after a few trials, established that incipient cracks in the end cut on this pipe, caused partly by the condition of the cutting tool, opened up in the flanging operation. After experimenting with about 100 pieces by using different cutting methods, varying the heating and speeds in the flanging operation, we were much discouraged with the limited results and foresaw the destruction of all our expensive pipe in our futile experiments. We had only four or five successful flanges out of the hundred to reward us for our work. We found several of these cracked open in the next day or so.

About this time someone, not the fabricator or his men, as they had withdrawn from the job in order to reduce charges against the job, had the happy thought that *if we would machine the cut end, we would work out the hair-cracks.* This was done on several pieces and every operation resulted in a perfect expansion. We held up the procedure for several days to determine whether they would develop cracks as the result of this cold working. The machining procedure solved our problem on this early pipe but subsequently the tube companies learned of better pipe production methods, and, with the use of a disk cutter, they improved the type of cut, giving better yields in the cold working operation.

Our first experience with the disk cutter nearly wrecked our growing faith in alloy pipe and tube production. When the first samples cut from pipe with the new cutter were delivered, the samples showed an extremely poor accelerated



# Keeps Metal PASSIVE

## ...another Plus that adds to RED LEAD'S Extra Rust Protection...

There is no question about Red Lead's acceptance throughout industry as the standard priming paint for *making metal LAST*.

One important reason is its ability to keep metal surfaces in a "passive" or rust-inhibiting state. Authorities agree that metal protective paint should be rust-inhibitive to give satisfactory performance.

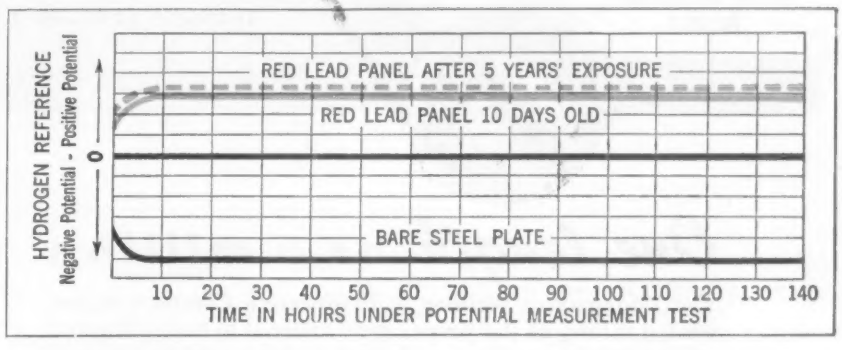
Time-potential curves, such as the one at right, are used to express rust-inhibitive properties of paint and thus indicate its effectiveness of protection. They show the effect of Red Lead on the potential of steel in the presence of moisture or water.

For example, a steel panel whose potential is *positive*, relative to hydrogen, is considered to be in a passive or non-corroding state. A negative potential indicates corrosion activity or rusting. The graph shows clearly the rust-inhibitive effect of Red Lead paint on steel as contrasted with the rapid and continuous rusting of unpainted steel.

Note that in this test a Red Lead paint film which had weathered 5 years was just as effective in preventing rust as one which had dried for only 10 days.

**Specify RED LEAD for All Metal Protective Paints**

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better metal paint if it contains Red Lead.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Negative Potential - Positive Potential
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RED LEAD PANEL AFTER 5 YEARS' EXPOSURE
RED LEAD PANEL 10 DAYS OLD
BARE STEEL PLATE
10 20 30 40 50 60 70 80 90 100 110 120 130 140
TIME IN HOURS UNDER POTENTIAL MEASUREMENT TEST

### *Proof That Red Lead Keeps Metal Passive

In the above test a piece of unpainted steel was immersed in water. Iron, going into solution, reacted with oxygen in the water to form rust. This unrestrained corroding state is indicated by a rapidly developed and maintained negative potential (see above graph). However, when steel panels painted with Red Lead were immersed under the same conditions, ferric and lead salts formed directly next to the metal. This action at once stifled corrosion by preventing the iron from going into solution, thus keeping the steel surface passive. The result is shown in the graph curves above, where a quickly rising positive potential remains constant throughout the test.

**Write for New Booklet**—"*Red Lead in Corrosion Resistant Paints*" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas ... ranging from Red Lead–Linseed Oil paints to Red Lead–Mixed Pigment–Varnish types. If you haven't received your copy, address nearest branch listed at right.

*All types of metal-protective paints are constantly being tested under all conditions at National Lead's many proving grounds. The benefit of our extensive experience with Red Lead paints for both underwater and atmospheric use is available through our technical staff.*

**NATIONAL LEAD COMPANY:** New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.); Charleston 25, W. Va. (Evans Lead Division).

**DUTCH BOY RED LEAD**

# WELDCO
## CORROSION RESISTING
# TUBING

## *One length* or a million

**The Youngstown Welding & Engineering Company makes welded tubing of the proper type material to best withstand your corrosion conditions. It is available in odd or standard sizes, in limited quantities or carload lots. It will meet your requirements for pressure and uniformity. Special equipment with low setup charges permits production of special tubing for individual needs at a practical cost.**

## FITTINGS AND FABRICATED PIPING

**A complete line of Weldco fittings is available. Weldco's well-equipped plant is in position to fabricate the entire pipe assembly you require.**

**THE YOUNGSTOWN WELDING & ENGINEERING CO.**

**3711 OAKWOOD AVE. YOUNGSTOWN, OHIO**

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*Specialists in Corrosion Resistance*


test. We had not known about the installation of the new cutter. By that time, mill experiences with the scientific production of alloy pipe and tubing were such that with the manufacturer's record available and ladle analysis, results of accelerated tests on the coupons could be confidently predicted. In this lot of tubes, nothing was wrong with the composition, physical characteristics or manufacturer's record of production. Yet several sets of samples taken from both ends of the tubes gave extremely poor test results and the mill checked with our tests, as by that time we had co-ordinated the test methods of our laboratories and those of the mills.

While studying the problem, a casual examination of an untested coupon indicated a bluish tint on both faces of the coupon, *indicating heating on supposedly cold-worked surface.* An examination of the other fresh coupons showed the same blue tint. A change in the speed of the cutting disk and the speed of the cut piece through the cutter, immediately solved the difficulty and this lot of pipe passed without further trouble.

We were bothered in the early stages of pipe production by the appearance of small clean holes in the pipe after it had been in use for a short time. Here, again, our experience with contamination in the rolling of plate stood us in good stead. An improvement in the drawing dies and a step-up in the production of alloy pipe and tubing warranted confining the use of drawing benches to production of alloy pipe and tubing alone, thereby eliminating infinitesimal high carbon steel slivers from the dies. This eliminated the development of the holes mentioned above.

**Our Own Ideas** regarding pipe and tubing are changing rapidly with the development of the art of welding. For a long time, we hesitated to use welded seam tubing. We have kept abreast of the developments in this field, trying out small lots here and there in our plants and our experiences are indicating locations where this type of tubing can be used. Many situations will continue to call for seamless tube in an unabated volume.

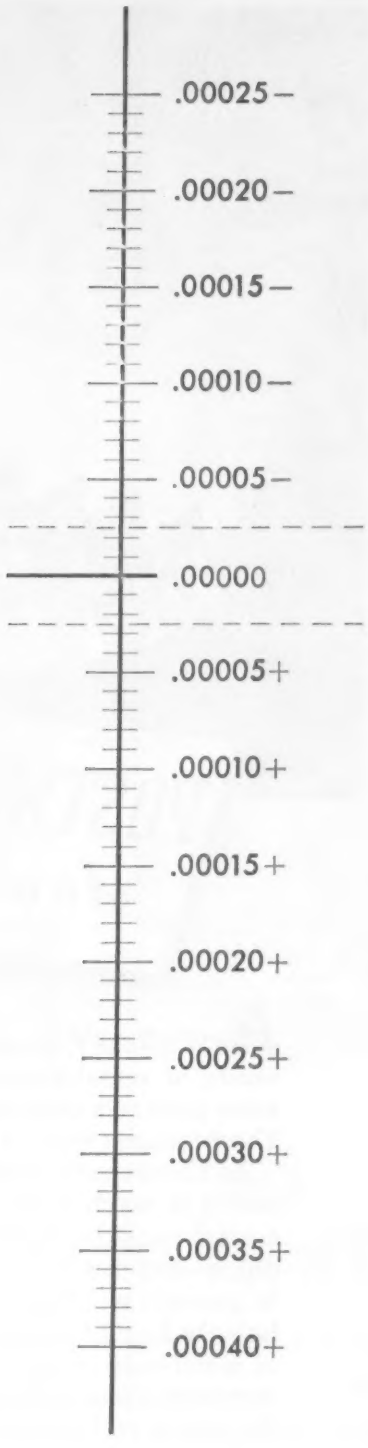
In the early use of chrome alloy materials, they were not recognized by any code or state law as suitable for pressure vessels and, therefore, it was necessary to obtain special approval of the insurance companies and State Board of Pressure Vessel Inspectors for the state in which they were to be used, for each piece of equipment.

Later the ASME Code for unfired pressure vessels recognized this use of these austenitic steels, which has to a considerable extent simplified our problems.

Manufacturer's records of complete chemical and physical tests are furnished along with the material supplied on our orders.

Our purchases of alloy castings were similarly fraught with problems. For a long time, however, our early purchases of castings were absolutely free of any

# Mass Precision and "*ghost*" tolerances




"Ghost" tolerances hover near the zero mark—these are tolerances in "quarter-tenths" and "millionths". To obtain such accuracy requires the proper machines, correct processes, skilled workmen, and gages to show the results.

Nichols has all the factors necessary to produce parts to "ghost" tolerances—*and something more.* It has the knowledge (based on 40 years' experience) to produce these parts *in volume, at low cost.* In short, Nichols can manufacture "mass precision" assemblies for you that can be priced to meet competition. When your work calls for "ghost" tolerances, call for Nichols.

A free copy of "Mass Precision" is yours for the asking.

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"Accurate" *Nichols*

PRECISION ENGINEERING AND MANUFACTURING FACILITIES FOR MASS PRODUCTION

POSTWAR PRODUCT
*of a million machines*

AFTER V-DAY, reconversion notwithstanding, thousands of metal-working factories will turn out the same products they made during and before the War. The products will be chips.

To the experienced eye, chips are valuable indicators of machining performance. Cutting fluids are a vital consideration in developing properly formed chips—not just to "cool" the tool and workpiece, but to prevent welding of metal to tool and to lubricate heavily loaded areas. So interrelated are the factors of metal-cutting operations that slight changes in the composition of cutting fluids alone can radically alter the shape and direction of chips.

Stuart men know how to make properly balanced cutting fluids—and how to apply them for top results. Through them, 80 years of experience is yours for the asking.

*The 60-page Stuart booklet, "Cutting Fluids for Better Machining," contains interesting facts about chips and cutting fluids. Write D. A. Stuart Oil Co., Limited, 2735½ So. Troy St., Chicago 23, Illinois.*

D. A. Stuart Oil CO.
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ESTABLISHED 1865
*Stocks in Principal Metal-Working Centers*

difficulty and our demands slowly rose to a point where we were spending several thousand dollars a year and obtaining beautiful tests in comparison with a succession of headaches accumulated as our demands for other alloy items developed.

Suddenly our latest deliveries of castings began to go bad but the old castings still held up. Our experience by that time was such that we instantly guessed that the mill had changed its methods of production and we confidently approached the company, firm in a belief that a co-operative effort would overcome the problem quickly.

To our amazement our supplier refused to listen to us, pointing to their long experience with alloy castings and blindly claiming a change in our operating procedure must have developed the difficulty. We were confident that could not be the answer, as our production was on absolute chemical control and the slightest deviation in procedure would instantly show up in the plant laboratory. Nevertheless, we conducted a careful check at our plant and found no change in our procedure.

This was reported back to our supplier who adamantly maintained the same attitude and even refused us admission to his plant on the ground that their method of production of certain other alloys was a closely guarded secret and a view of the production of our castings would disclose that operation to experienced eyes.

There was nothing to do but grant the demand of the foundry to complete our orders while we conducted our own investigation. In the meantime we were getting desperate for castings. We made our own analysis of the castings and had them checked by professional laboratories.

**The Result Confirmed Our Suspicions**—the nickel content in the latter straight 18 per cent castings in which we were accuctomed to specify no nickel showed a strong measureable quantity of this metal. We called this situation to the foundry's attention but received only a curt reply.

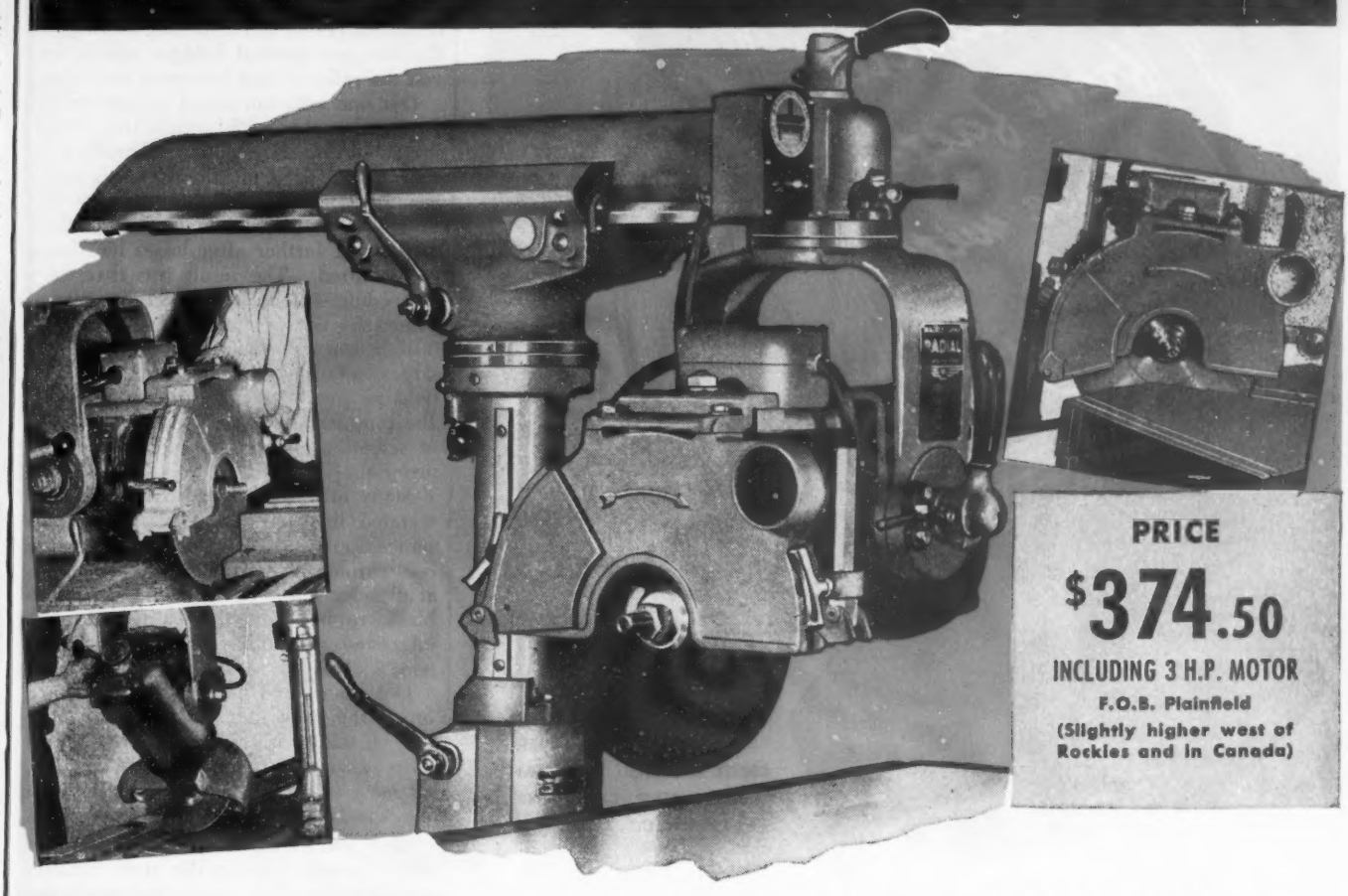
We could only look for another source of castings. Fortunately, during the negotiations, we had been approached by a new firm entering into the alloy casting field. Its appearance and our subsequent satisfactory experience with its product took a tremendous burden from our shoulders.

The above difficulties are reported only to show both sides of our experience in contributing to the development of an industry. It was the only dark spot.

The production of alloy metals undoubtedly is still a new industry, although identified with the steel industry. The demands for alloys are now so large that specialists who have not been trained in the old school of tonnage production must be attracted to this field.

We are convinced that these men looking into the future without prejudice can foresee an alloy production mill comparable in its technique with the air con-

# THIS *Universal Head* SIMPLIFIES COMPLICATED CUTTING OPERATIONS

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**$374.50**

**INCLUDING 3 H.P. MOTOR**

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**(Slightly higher west of Rockies and in Canada)**

# Walker-Turner METAL-CUTTING RADIAL MACHINE

The head on a Walker-Turner Metal-Cutting Radial Machine can be quickly set to cut at any angle. Cuts wide metal shapes. Will dado, trench, miter, *even operate with motor in vertical position.* Patented Walker-Turner Geared Motor is shock-proof, gets shaft closer to work, makes deep cuts with smaller blades than in conventional motors. Blade feeds through work with shorter cutting arc and less frictional heat. Operator gets clear view of work, no interference from overhanging arm. Write today for complete information.

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When it comes to making a choice of materials for your product, don't overlook precoated cold rolled strip steel. ThomaStrip is available with coatings of zinc, copper, brass, nickel, tin, solder, and lacquer in color. These precoated finishes solve your plating and finishing problems *and often entirely eliminate plating in fabricating plants.* Crackproof and peelproof finishes speed production and provide uniform coatings on inside and out of complicated parts. Write for literature today.

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COLD ROLLED STRIP STEEL SPECIALISTS

ditioned, clean, scientifically controlled plants of the food and dairy industries. In these plants science can reduce the cost of production materially below those of today. These men should know that with each 1 cent per pound reduction in selling price of alloy steel, the field will be remarkably increased and at no sacrifice to the carbon steel industry.

They will be convinced, for instance, that the bridge built of carbon steel will be as outmoded in future engineering, as the wooden covered bridges which served the railways and highways are today.

Our one criticism based on experience is the slowness with which the art of producing the alloy tube developed. This branch lagged behind the advances made in other materials. The reason is the refusal of the early entrants in the field to proceed further after losses had been accumulated. The result was that each ucceeding entrant, lacking the experience gained by the previous casualty, started farther down the ladder than was necessary. Now, however, like similar conditions in many other fields of endeavor, the pipe industry promises to run ahead of scientific advance in other classes of material.

Many other experiences could be enumerated if space would permit, for instance, our early discouragement when our chrome alloy plates under certain acids, changed to a condition similar to black rubber and the co-operation of interested steel mills to solve this problem.

Our plants and personnel always have urged the steel industry to observe our use of alloy steels, and the results we have obtained. Through these contacts, all have co-operated with enthusiasm in the standardization of accelerated tests.

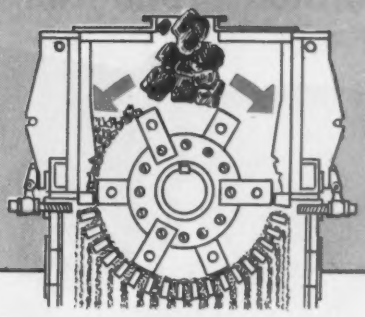
Our admiration is added to that of other laymen outside the steel industry for the tremendous energy and vast scope of an industry which is based on a product selling for a few cents a pound at the mills. We can be sure such an industry will develop steels selling at economical prices, which will eventually widen its scope of operations.

## Trench Knife Performs Variety of Jobs

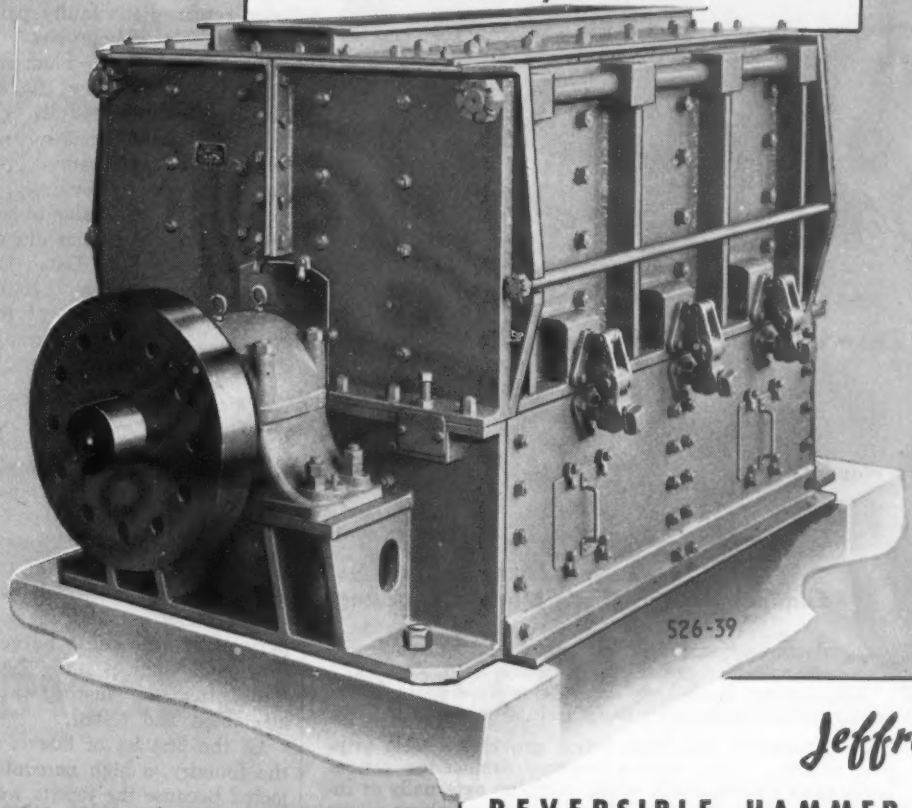
A utilitarian trench knife, manufactured by Imperial Knife Co., Providence, R. I., is made so that it fits over muzzle of a carbine rifle for use as a bayonet and also can be used to open cans, pull nails, whittle wood, and do many odd jobs.

Knife is made of finely tempered steel and is formed, ground, heat treated and honed to a razor-like edge. After a final polishing, blade is Parkerized to resist corrosive effects of all kinds of weather, according to a recent issue of *The Parkerizer,* published by Parker Rust-Proof Co., Detroit 11. Finish both protects blade from rust and also removes gleam that might attract enemy attention in combat. Blade is provided with a handle composed of leather rings tightly pressed together on shaft.

# REVERSIBLE TO SAVE YOU TIME



**The reversible feature of this Jeffrey Heavy Duty Hammer Crusher saves 50% of the time ordinarily required to turn hammers in one-way crushers.**




*Jeffrey*

**REVERSIBLE HAMMER CRUSHER**

**Saves time, more economical and better sized product where coal is prepared for making metallurgical coke. Capacities up to 300 T.P.H.**

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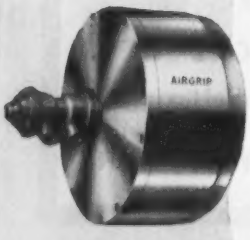
# Get Ready for Reconversion Production

## "Chuck" High Machining Costs with AIRGRIP Chucks



**"AIRGRIP'S" Two-Fisted Gripping Power**

**Eliminates Slow, Costly Manual Chucking**

Reconversion — and returning competition — will demand every possible cost-cutting help. "AIRGRIP" Chucks cut machining costs—save time spent laboriously releasing chuck by hand, reduce set-up time.

Also, "AIRGRIP'S" two-fisted action provides double gripping power . . . air PLUS a two-way cam-wedge action. Locks jaws mechanically when gripping externally or internally. Even if air supply fails, cam-wedge locking power holds work securely, prevents accidents.

To push output *up* . . . to push production costs *down* . . . equip your lathes with "AIRGRIP" Chucks.

**"AIRGRIP" Revolving Air Cylinders**

Cut maintenance costs! "AIRGRIP" Revolving Air Cylinders operate for years without attention—wear is automatically taken up by air pressure within cylinder. No manual adjustments. Patented double ball bearings permit speeds formerly impossible.

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For controlled lift or grip, push or pull, use "AIRGRIP" Dual Action Non-rotating Cylinders. No skilled labor required to take apart: no tie-rods: either end of cylinder can be removed. Piston packings graphite-treated; require no adjustment; wear automatically taken up by air pressure.

OTHER ANKER-HOLTH COST REDUCERS include Air Operated Collets, Arbors, Mandrels, Drill Press Chucks, 2- and 3-Jaw Finger and Compensating Chucks, Revolving Air Cylinders, Lubricating Assemblies, 3- or 4-way Air Valves (hand or foot operated), etc. Also Hydraulic Power Units and Fittings.

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2792 Connors Street Port Huron, Michigan

*When buying new lathes, specify "AIRGRIP" Chucks and Cylinders*


## X-Ray in Postwar Era

(*Continued from Page* 103)

the radiographs. After the 3-week period, co-operation between Delco and the foundry resulted in an improved casting technique which reduced rejections to less than 2 per cent.

It is a safe guess that without X-ray this process of improvements would have consumed a very much longer period of time. A reproduction of a typical X-ray picture of the troublesome housing is shown in Fig. 4.

In another case, a simple aluminum bearing housing was ordered from a foundry, and all deliveries were radiographically inspected upon their receipt. Blow holes and porosity were discovered. Delco returned the faulty parts and sent along sample radiographs. By making an analysis of the problem from the information supplied by the radiographs, this foundry successfully changed its technique, and within a surprisingly short time the rejection rate dropped to less than 1 per cent. Obviously, much more important than the value of such a single rough casting is the amount of irreplaceable time saved by Delco in machining only perfect castings. Radiographs of good and bad samples of this part appear in right and left halves, respectively, of Fig. 1.

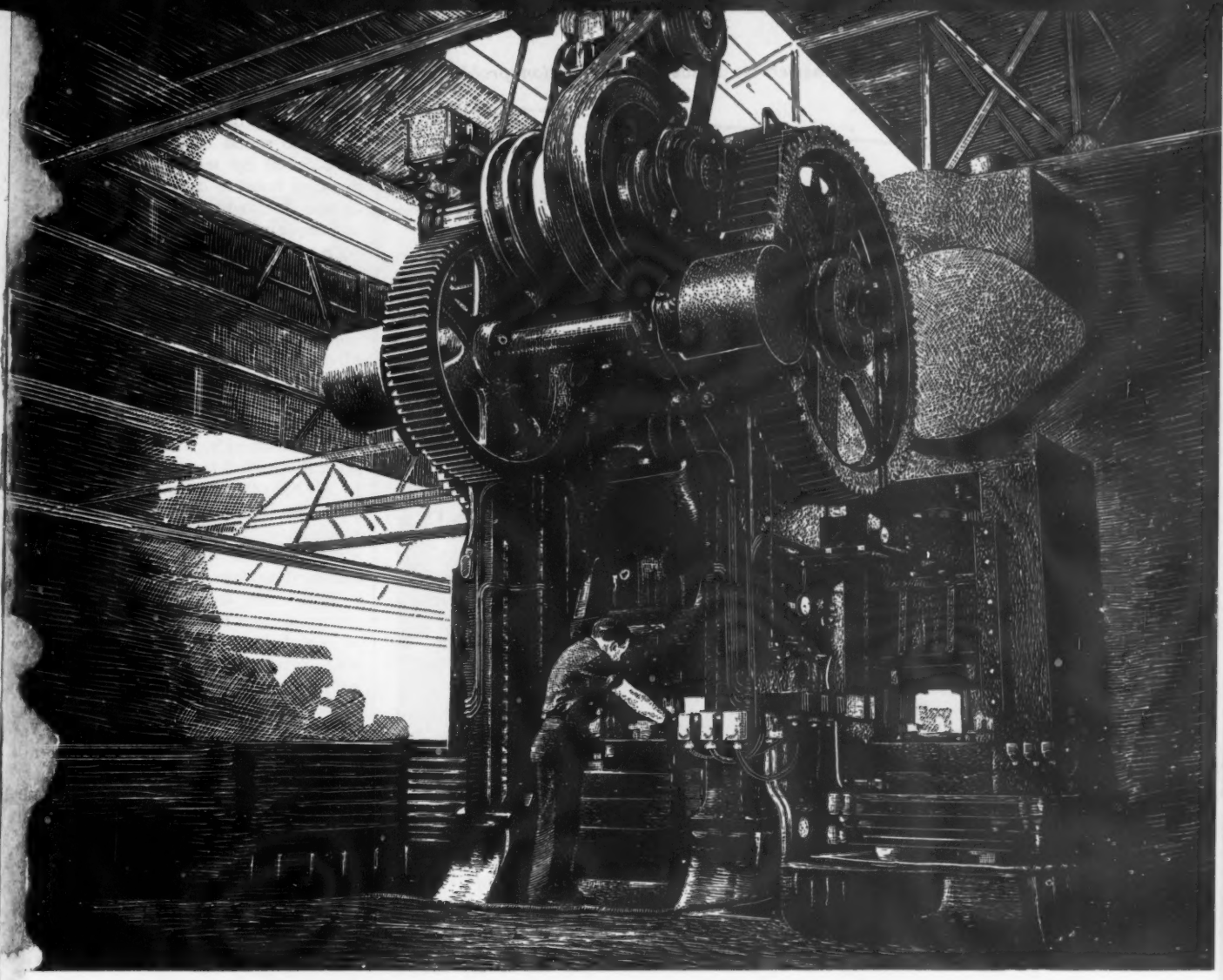
### Castings for Electric Motors

In another case, Delco required considerable quantities of small aluminum motor shaft housing castings which had to be supplied with 3-piece metal inserts. If the inserts were not properly located and soundly bonded to the casting metal, electric motors for which parts were intended could not perform properly. Imperfections here could be very costly, as they could not possibly be determined until after the motor was completely assembled and tested.

Of the first lot of inserts delivered by the foundry, a high percentage were rejected because the inserts were not properly aligned or completely bonded to the base metal. Many changes in technique were tried, radiographed, and studied by the foundry. Problems were finally overcome, and rejection rate on the improved castings is now less than 5 per cent. Here is a case where a part so small that 140 of them can be X-rayed on a 17 x 14 film might nevertheless have proved a very serious production bottleneck without the help of Roentgen's ray.

Delco also finds X-ray useful in connection with its own production of plastic products, such as aircraft distributors with copper inserts. In Fig. 2 are shown radiographs of both imperfect (a) and acceptable (b) distributor moldings. The distributor pictured on the left probably would not function properly because one of its inserts is bent so badly that it might arc with one of the inserts on its left. If defect had not become apparent until final assembly, valuable machining hours would have been wasted.

Oberdorfer Foundries at Syracuse,



# WHAT TO DO...WHEN A *Big Bertha* BREAKS

When a drop hammer, forging press or similar-sized giant in the factory production line stops its work due to a broken frame or other part, the resultant loss to output and profits is serious. But how different the picture can be when Thermit welding is called on to avert a shutdown and effects a speedy, permanent emergency repair job!

Thermit welding is being used to great advantage to reclaim damaged heavy parts such as axles, machine frames, crankshafts, hot strip rolls, crab couplings, tube rolls, pinions, gears and other heavy tonnage parts.

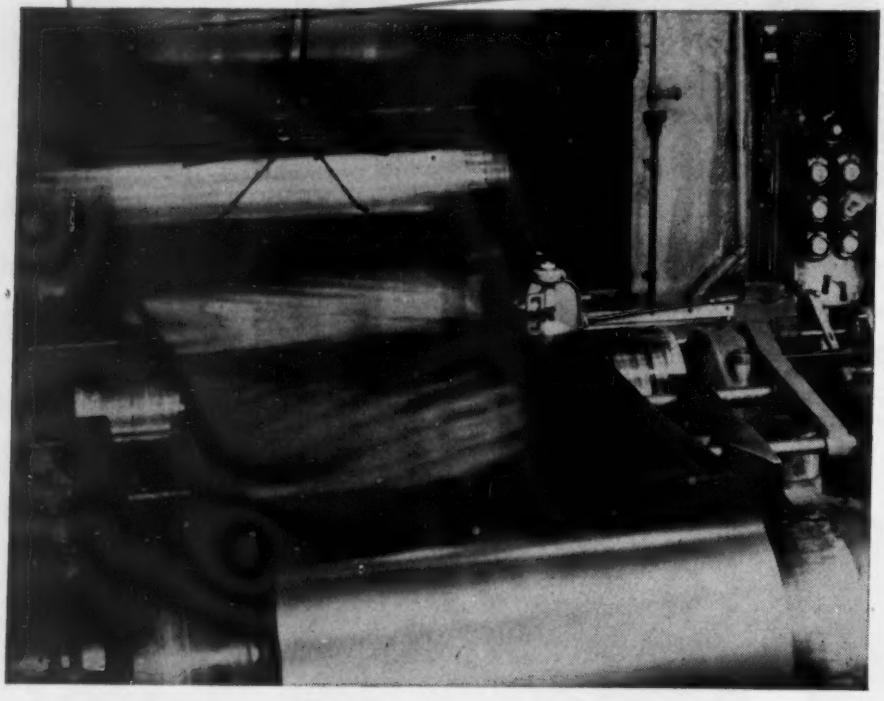
The Thermit weld is as strong as a forging of the same cross-section and the dense, sound weld requires no stress relieving. No preliminary machining is necessary. Thermit welding can be done in your own plant by your own crew, after instruction by an M & T supervisor, or at one of the M & T plants.

In addition to repair work, Thermit welding is widely used for the fabrication of large units from smaller castings, forgings, or flame-cut shapes. This saves time, money and handling of very large units. For complete information on the Thermit welding process write today for booklet, "Thermit Welding", to Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y. Albany, Chicago, Pittsburgh, So. San Francisco, Toronto.

**Thermit Welding**

No. 3 IN A SERIES...*Some helpful answers to industrial lubrication problems...*

# "Penola Prescriptions"



THE PROBLEM...In a mill rolling stainless steel, oil is used as a roll lubricant. After cold rolling, the steel is annealed. Considerable effort is required to remove all the oil from the sheets before annealing. This additional process is necessary because oil left on the sheets forms a hard deposit that stains and is difficult to remove.

THE DIAGNOSIS...A lubricant which would eliminate the cleaning process, would speed up production, and result in a substantial money saving. This lubricant must provide all the required protection against friction, but must also leave no damaging residue.

THE PRESCRIPTION...

Rx

**CALORIA 50**

**This unusual lubricant possesses a high melting point. Its most amazing feature however—possessed by no other lubricant, save those in the Caloria group—is that it disappears completely when it evaporates. Spraying Caloria 50 on the stainless sheets during the rolling process entirely eliminates costly and time-wasting cleaning.**

**PENOLA LUBRICANTS**

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Penola
Reg. U.S. Pat. Off.

PENOLA PRODUCTS HAVE MEANT EXTRA PROTECTION SINCE 1885

N. Y., have found that X-ray pictures have enabled them to convert scrap parts that would be worth only $840 per month to sound castings having a value of $35,000 by welding imperfect 40-lb flywheel housing castings of complicated design for which no perfect casting technique yet has been developed. Even with the most careful methods, flaws occurred in this part, causing 12 per cent rejections.

More serious than the scrap loss was the time loss, since deliveries were rapidly falling behind requirements. Fig. 3a is a close-up of a typical flaw as marked. Fig. 3b shows how area appeared after repair weld was made. Here radiography, as proof of soundness, accounted for the salvaging monthly of $35,000 worth of parts, enabling the foundry to meet delivery requirements and, in addition, to increase its yield and pass on to its customer a 20 per cent savings.

In another case, Oberdorfer was approached by a builder of gasoline engines who had designed a new style crankcase with many desirable qualities. It was simpler in design, lighter in weight, and could be machined rapidly and economically. Several other foundrymen who the builder felt could do the job also were contacted. Most of them believed that the casting had such features that it would be impossible to produce and suggested design changes; but since such changes would have eliminated many of the advantages offered by the original, the builder persuaded two of the foundrymen to have a try at it.

### Radiographs Eliminate Defects

After trying for 3 weeks, one foundryman gave up. Oberdorfer was meeting with better success but was having considerable trouble with bad shrinkage in the manifold exhaust ports. By making radiographs of successive castings for study and analysis, they were able to eliminate defect after defect as they occurred. A standard trouble-free port casting technique finally was worked out and delivery of sound castings was started. The engine builder found that castings met requirements and that machining and performance were entirely satisfactory. As a result, Oberdorfer was given an order for all the crankcases required instead of a portion as had been originally intended.

Radiography can be helpful in determining proper pouring temperatures for diecasting as shown by the following case history. A foundry was delivering large quantities of castings that looked good and appeared sound but, as a result of irregularities uncovered during machining, were being rejected in quantities amounting to 45 per cent of production.

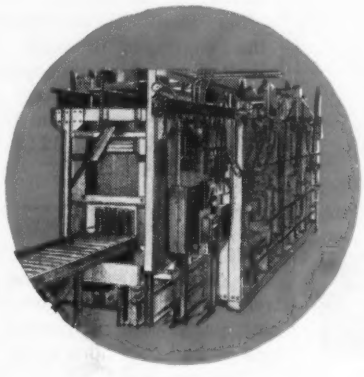
These rejects not only cut the yield of the foundry to a very low figure, but caused serious delays in meeting delivery schedules. Careful investigation of the returned rejects by the chief metallurgist determined that the reasons for the rejections were enlarged grain size

# ENGINEERING

# Plus. . .

Postwar competition among manufacturers in the metal-working industry will put a high premium on production economy. Because effective heat treatment is so important in determining production costs and product quality in many instances, heat treating processes and equipment merit the closest scrutiny today.

The principal characteristic of the design of a Holcroft Heat Treating Furnace is that it combines combustion and metallurgical engineering with more than 30 years of experience in this one specialized field.



Of this combination, experience is the more important for it is the best assurance that the furnace, when put into commission, will do just what is expected of it and operate at a minimum cost.

***Before carrying your postwar plans any farther, consult with Holcroft engineers on your heat treating procedure.***

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**Leaders in Building and Designing Electric and Combustion Furnaces, Kilns and Ovens**

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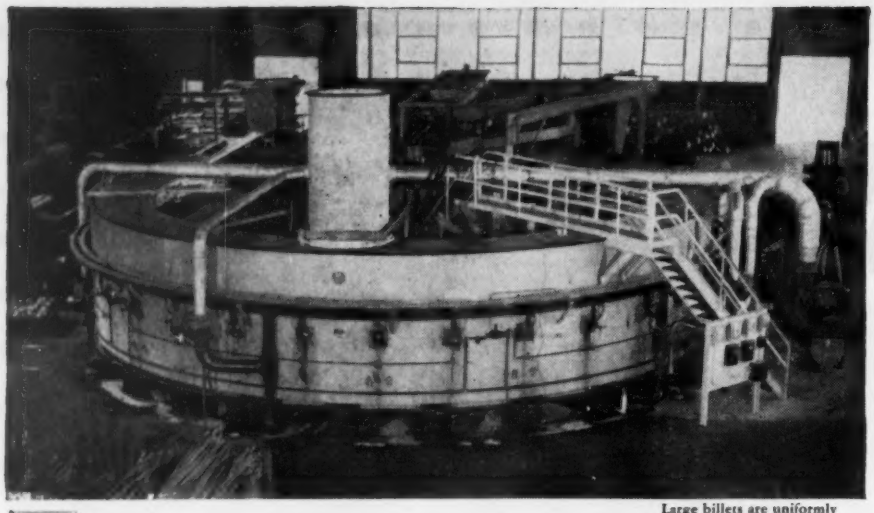
CHICAGO—C. H. Martin, 1355 Peoples Gas Bldg.
CANADA—Walker Metal Products, Ltd., Walkerville, Ont.



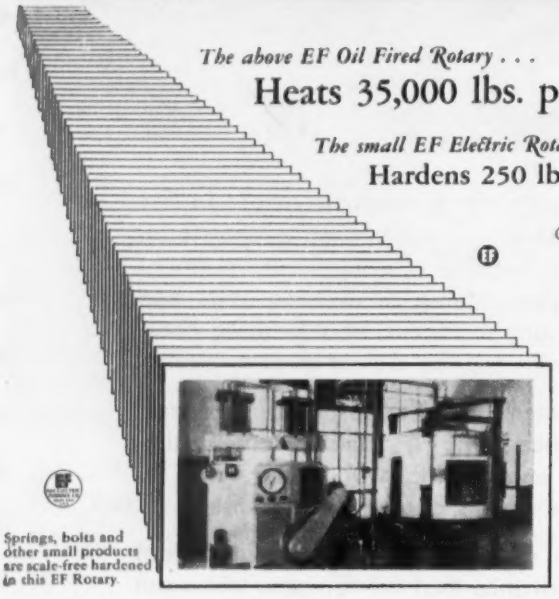
Large billets are uniformly heated in this EF Rotary.

*The above EF Oil Fired Rotary . . .*

**Heats 35,000 lbs. per Hour**

*The small EF Electric Rotary below . . .*

**Hardens 250 lbs. per Hour—*Scale Free!***



Springs, bolts and other small products are scale-free hardened in this EF Rotary.

IN our files are the designs and complete records covering the thousands of EF Rotary and other continuous and batch type furnaces we have built—the result of over 25 years of practical furnace building experience.

Products ranging from small balls for bearings to structural shapes 90 feet long are being handled in EF furnaces.

This experience is available to you in helping solve your particular furnace problems.

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and porosity caused by imperfect pouring temperatures. The foundrymen felt that the importance of the pouring temperature was overemphasized and pointed to the apparent soundness of the castings which were being produced. Experimental melts were poured at temperatures of 1250, 1350, 1450, and 1550 F, respectively, and radiographed. The latter three were increasingly grainy and porous as shown by the radiographs (Figs. 5a, b, c and d) and only the melt poured at 1250 F was satisfactory. This temperature was adopted as standard and rejections dropped to less than 15 per cent, increasing monthly acceptances by 200,000 lb of production.

Now consider a case in an alloy steel casting foundry. In 1943, the Cooper Alloy Foundry Co. of Hillside, N. J., was offered a contract for turbine-type supercharger diaphragms, with an initial production requirement of ten per day. The requirements on this part are extremely rigid. Even though centrifugally cast, parts were permeated with porosity and so bad that none could be delivered.

Changes could not be made easily in the gating practice because of the centrifugal technique, and the casting design precluded significant changes in pouring temperatures. Moreover, the metal had to be hot enough to flow through the thin vanes in the flange. Experimentation was begun with different sand compositions, mold cleaning and venting practices, and the successive radiographs, made as improvements persisted, soon resulted in sound castings. The difference between an early attempt and the present product is shown in Figs. 6a and 6b. Well over a hundred of these critical parts are now produced daily with rejections less than one-half of 1 per cent—through X-ray.

The 1000-plus users of industrial X-ray are finding that it solves many more problems than those concerned solely with inspection. Its continued use through the postwar years should mean structurally sound and safe, efficiently produced products.

## "Steel Expansion for War" Available in Book Form

**Report prepared by W. A. Hauck of the Steel Division, War Production Board, has been reprinted in the form of a 192-page book with 148 illustrations of principal steel industry projects. Included are details on capacities, costs, reconversion and other factors involving ore transportation, ferroalloy, refractory, blast furnace, other facilities constructed to meet the enormous demands of war. A limited number of copies of "Steel Expansion for War" are available at $2 each, postpaid, from the Book Department, STEEL, 1213 West Third street, Cleveland 13.**

*Investigate*

# POLLAK'S CO-RELATED FACILITIES

## FOR MANUFACTURE OF PRODUCTS AND ASSEMBLIES FOR POSTWAR PRODUCTION

Looking ahead to the time when materials and manpower can again be devoted to industrial production, we list below some of the specialized features of Pollak facilities.

Pollak has ample equipment in these specialized departments for coordinated operations to turn out complete products and assemblies.

Pollak also has engineering and research facilities for designing and building complete products preparatory for production, *when our plants are released from war work.*

### FACILITY NO. 1

**BLANKING—STAMPING—DRAWING**

Complete facilities in these departments, ranging from very small precision work to medium heavy work in carbon steel, stainless steel, brass, bronze, Monel Metal, Inconel, aluminum and the stronger aluminum alloys. Maximum depth of draw 11½ inches; maximum diameter of shallow stamping about 45 inches.

### FACILITY NO. 2

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Ample equipment for long runs in conjunction with other featured services ranging from lightest up to ¼ inch in steel and up to ½ inch in aluminum. Includes fabrication of tanks and process vessels of all the corrosion resistant metals.

### FACILITY NO. 3

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Specializing in and equipped for large production in welding and brazing by oxy-acetylene, oxy-hydrogen and electric arc processes, particularly in the more difficult alloys.

### FACILITY NO. 4

**ELECTRIC SPOT WELDING AND SEAM WELDING**

Equipped in the various ranges for very light work and up to ¼ inch material in steel and up to ⅛ inch material in aluminum.

### FACILITY NO. 5

**MACHINE WORK**

In this department we are equipped for large scale production. Hand screw work from the smallest up to 3½ inch diameter bars. Multiple-Spindle Automatic Screw Machine work from the smallest up to 2⅝ inch diameter bars. Lathe, Milling Machine and Drill-press work in capacity to balance other departments. In addition to normal, general purpose equipment, we design and build special manufacturing equipment, when justified by production requirements.

These Pollak facilities are operated in conjunction with other manufacturing departments such as Spinning, Electrical Work, Heat Treating, Assembly and Plating. These individual Pollak facilities are operated as a unit and ordinarily they are available only for work of a nature which will keep this operation in balance. However, this limitation is not always applicable.

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Our designers and engineers will welcome the opportunity to assist in planning the details and specifications of your product. Naturally your plans will be held in strictest confidence. So if there is a fabrication or design problem in your postwar plans, we invite you to discuss it with

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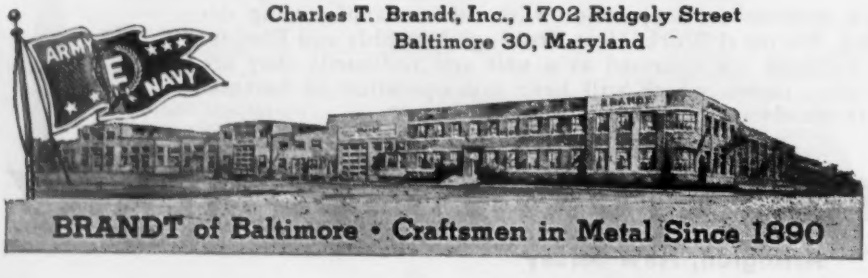


BRANDT of Baltimore • Craftsmen in Metal Since 1890

## Progressive Heating

(*Concluded from Page* 104)

guaranteeing uniform temperature drop.

The time per spacer in treatment was found to range from 3 to 6 sec which means from 600 to 1200 per hour of continuous operation. Actually we have to stop at intervals of approximately 50 spacers and remove the treated parts from the quench. But the output was increased tremendously over the old method, the evils of brittleness and warpage stopped, an operation eliminated, and the job made ideal for a woman operator.

## Head Stock Spindle Turns Large Bolts

A head stock spindle, shown in illustration, has been developed at General Electric's Pittsfield Works to turn large bolts of the body-bound type. Handling time, both in and out of the lathe, has been reduced 50 per cent. Both ends of

bolts are centered, and, when they are placed in the lathe, a drive force is obtained by contact with two ⅜-16-in. set screws. Regardless of how bolts are turned, it is necessary to center both ends for grinding. This method eliminates the slow, conventional method of holding bolts in a chuck, increasing production.

## Bronze Electrode Used with AC, DC Currents

A coated special bronze alloy electrode, EutecTrode 28, has been developed by Eutectic Welding Alloys Co., 40 Worth street, New York 13, for use in arc welding bronze, brass and copper. It is shielded with flux coating, making it suitable for use either on ac or dc current. Electrode deposits dense and tough metal that is a good color match to most bronze, and is said to give welded area substantially the same corrosion resistance as various base metals possess. It also may be used for welding copper and brass or joining these metals to steel, cast iron, or nickel alloys, and for overlaying steel or cast iron to provide good bearing surface. Electrode is available in ⅛-in. and $\frac{5}{32}$-in. diameters with a light green tip. Procedure sheet on proper use and application of EutecTrode 28 may be obtained from Dept. A-2 of the company.

# New NORFLEX POLISHING WHEELS

Many finishing, de-burring and polishing jobs on welds can be done better and more economically with NORFLEX* Polishing Wheels—a new Norton development.

Available in three types to meet varying conditions and requirements they all have the common characteristics of leaving smooth, uniform finishes. In all three types the abrasive is uniformly impregnated throughout the wheels from periphery to hole. Also common to all three is the flexible type of bond which supports and holds the abrasive particles in place.

The ability of NORFLEX Polishing Wheels to meet a wide range of conditions is due to the available choice of cushioning materials in the bond: Fiber Resinoid, Type F; Resilient Rubber, Type R; and Cork Resinoid, Type C. Your Norton abrasive engineer or Norton distributor will give you the complete story.

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PRECISION PARTS

FOR THE LONG GRIND AHEAD
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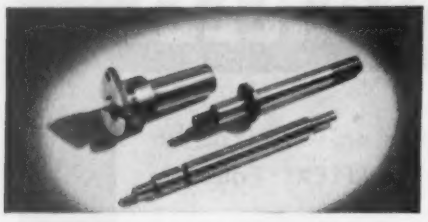

*. . . intricate brazing-jobs made easy*

When the last Jap lays down his gun, American industry will begin settling back to competitive production. No longer will it be production for production's sake. The business will go to those manufacturers who have learned a faster, better way of doing things, and who can apply their war-time lessons to the peace-time years ahead.

Grinding-out small parts by the thousands, yet holding to amazingly close tolerances, is an Ace war-time accomplishment that offers real competitive and performance advantages. Here you will find the experienced operators, the up-to-the-minute machines and equipment, and the responsibility of intelligent management to handle your parts from rough stock to finished piece.

If you have any small parts and assemblies calling for stamping, machining, heat-treating, and grinding, it will pay you to consult with Ace. Send sketch, blueprint, or sample for quotations.

GRINDING CAPACITY NOW OPEN

The Idler-Shaft, the Rotor-Shaft, and the Clutch-Bushing shown above are typical of Ace grinding-operations. They involve internal, external, thread, and centerless grinding to .0002" tolerances. Ace makes these parts by the thousands, and a modern, well-equipped inspection department assures uniform accuracy of each piece.

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ACE MANUFACTURING CORPORATION
*for Precision Parts*

1249 E. ERIE AVENUE, PHILADELPHIA 24, PA.

## Tapered Bearings

(*Continued from Page* 112)

accuracy have been designed and built especially for this work.

So close are the limits maintained that gages for checking angles of cups, cones and rollers are measured on a machine capable of measuring to a single second of arc—one millionth part of a complete circle.

An important step in the inspection of finished cones and cups is the Magnaflux test, Fig. 14. Here the parts are strongly magnetized and a solution carrying small iron particles in suspension is run over the parts, revealing any minute surface or subsurface defects. Even cracks too small for the eye to see become clearly evident.

After demagnetizing to prevent any metal particles from being attracted into the bearing when assembled, the races are gaged for selective assembly; that is, cones slightly oversized on the outside diameter are matched with undersized rollers so that the entire assembly meets the strict standards set up for dimensional accuracy. Similarly, undersized cones are matched with oversized rollers. Parts are assigned an index number according to the group of tolerance limits into which the part happens to fall. Then when selective assembly matches the parts by corresponding groups, a correct bearing assembly results.

Fig. 15 shows one of the special gaging setups employed for sizing cones. Fig. 16 shows a similar setup used in checking cups. Both machines employ the tapered working surfaces to multiply the indications, thus enabling standard dial gages to check diameters with extreme accuracy.

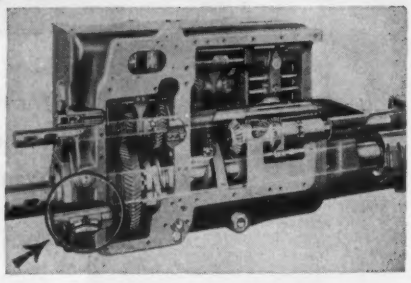
In Fig. 15, the operator places a cone over the lower fixture. A foot-operated treadle then raises the fixture vertically so the tapered surface of the cone engages a master mating surface held stationary in the upper part of the tester. It is easy to see that an undersized cone will go into the master part farther than a correctly sized one. And this measure of displacement from normal position is used to operate a dial gage through a leverage system which mechanically multiplies the movement to still further increase the accuracy of the check.

On this particular setup, the dial is marked uniformly from zero to 12. The limits allowed any cone falling within the range from 5¾ to 8¼ to be passed as O.K.

Fig. 16 shows a similar setup for checking cups. Here the cup is placed over a master mating part on the lower portion of the fixture while a flat plate is moved down against the edge of the cup. A dial gage set to measure axial movement from normal here indicates variations in diameter by utilizing the tapered working surface, as in the setup in Fig. 15.

But the unit in Fig. 16 is also arranged to check uniformity of taper as well. The lower fixture is arranged so

MAKE
MACHINE
BEARINGS



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Machines can be improved and their manufacturing cost reduced by use of tool steel tubing for tubular and ring-shaped parts. The milling machine headstock shown above has a main spindle sleeve bearing (lower left) made of tool steel tubing, providing several advantages over the previously used bronze bearing. Write for details.

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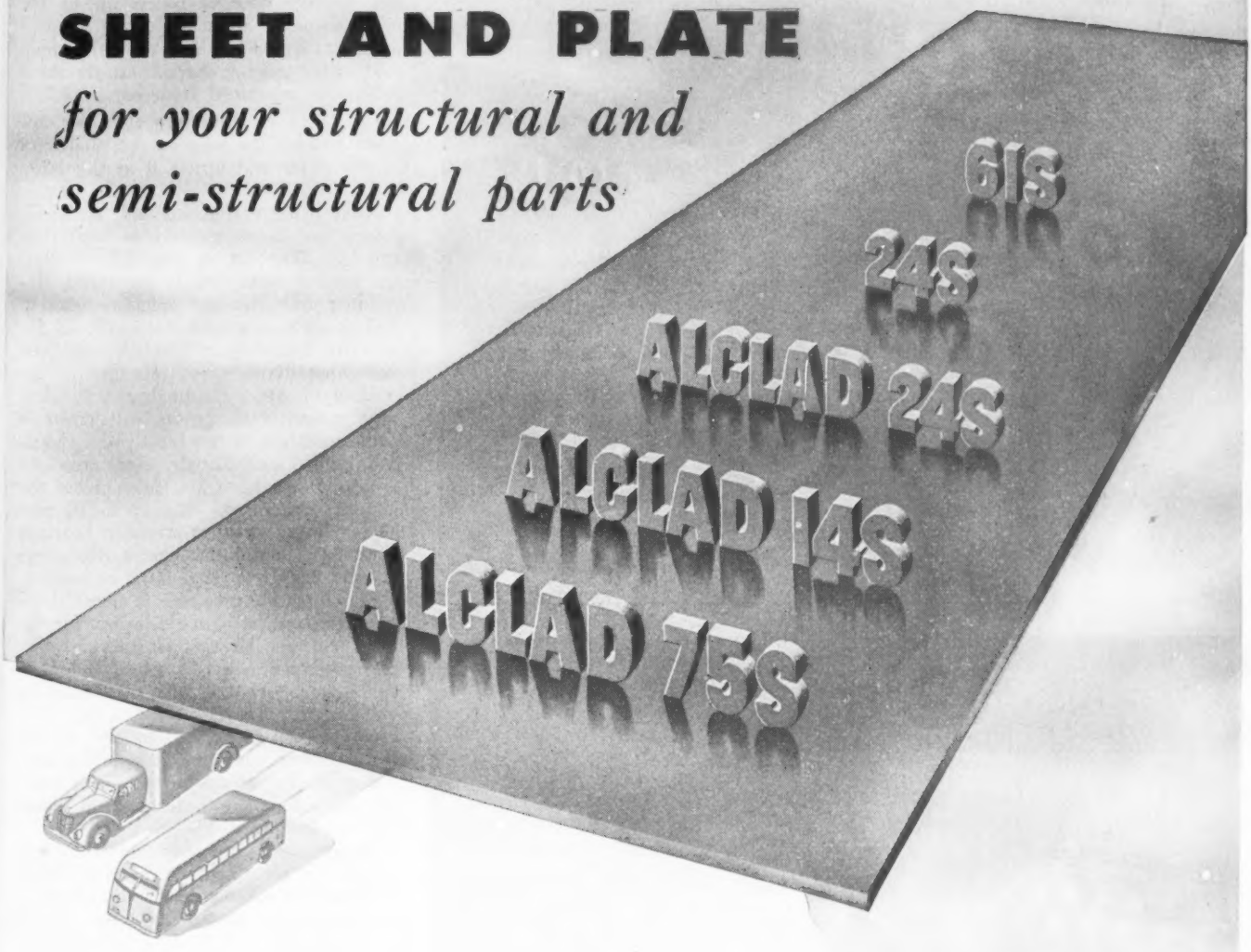


Strong aluminum alloys, available through Alcoa, cover a wide range of mechanical properties.

Designs of peacetime equipment are already feeling the effects of wartime experience with these high strength alloys. The transportation industry, for example, plans to use them to lower weight, increase speed, reduce power consumption, or get greater payloads.

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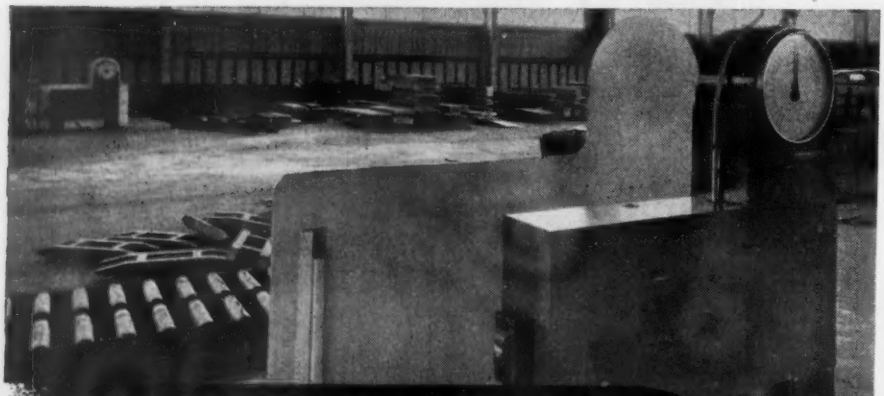

# FINISHED Steel WEIGHTS *Automatically* RECORDED

THE accurate recording of finished product weights is a highly important steel mill operation. The illustration shows two Streeter-Amet Type B units. The one in front automatically records the weights of flat sheets as received from the flying shear. The rear unit records weights of sheets in bundles preparatory to shipment. In both installations, weights are automatically printed in clear type . . . providing accurate, dependable records for all departments concerned. Streeter-Amet recorders serve all branches of the steel industry. Write for an engineering bulletin.

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that it can move differentially with the upper contact. Then as the fixture is revolved with the cup in contact, any variation in taper will show up as difference in reading of the two dial indicators which are mounted in the lower fixture to read this differential movement.

**Production Of Rollers:** The same steel employed in the races of a bearing is also used in making the rollers. However, it comes from the mill in the form of wire cold drawn from the hot-rolled rod. Smaller sizes of rollers up to 1¼ in. in diameter are made on mechanical upsetters, Fig. 17, which work the stock cold to the desired shape. Larger sized rollers are machined from bar stock.

Wire size is chosen so that the upsetter reduces the wire on the small end of the roller and upsets it at the large end.

After being carburized and hardened, rollers are finish ground in centerless grinders like that in Fig. 18. Rollers are ground from two to six times, depending upon size and precision wanted. Rollers are then gaged automatically for selective assembly in specially designed units that divide them into groups according to size. In the broadest tolerance range, each group will cover a range variation of one-fourth of a thousandth of an inch. Usually there are eight groups, four above and four below the nominal dimension. But 12 to 16 may be employed for ultra-precision bearings wherein each group covers a size range of only 0.0001 (1/10,000)-in. or less.

Such extreme precision is essential for proper operation of the bearing, for the load will not be carried uniformly by the rollers unless they are exactly identical in size. That is why they must be matched so closely. Then too, this close grouping enables the rollers to be matched with cups and cones in the various tolerance groups so that the completely assembled bearings will come out exactly to size.

As an example of how these tolerance groups are set up, the nominal diameter of a tapered roller at the midpoint along its length may be 0.50000-inch. For a particular type of bearing where maximum precision is not required, the groups may cover a total range of plus or minus 1/1000-in. divided into eight groups, each covering one-fourth of a thousandth of an inch as follows:

| Above: | Below: |
|---|---|
| 0.50000-0.50025 | 0.50000-0.49975 |
| 0.50025-0.50050 | 0.49975-0.49950 |
| 0.50050-0.50075 | 0.49950-0.49925 |
| 0.50075-0.50100 | 0.49925-0.49900 |

Of course, ultra precision bearings will have tolerance groups with ranges covering one-tenth of a thousandth, or less.

**Automatic Gaging Machine:** The device that automatically checks the rollers and separates them into the tolerance groups is most interesting. It works at great speed, yet is so accurate that if all the rollers that have been separated into a single group are re-run through the machine, less than 5 per cent of them will go to the groups on either side. And this is unavoidable since that number

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Illustration shows a 6-spindle Acme Gridley Automatic, on which Permite Permanent Mold Aluminum Cast Master Brake Pistons are being machined at the rate of 1200 per hour.

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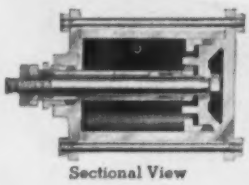
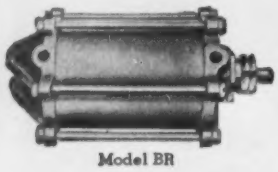
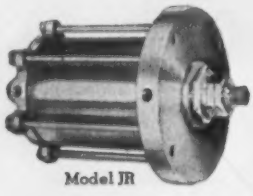
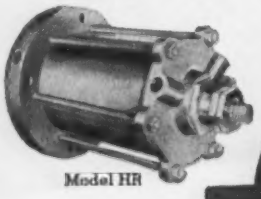
**PERMITE** ALUMINUM ALLOY CASTINGS


Sectional View


Model BR


Model JR


Model HR

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of rollers in a single group may easily have dimensions right on the limit line.

Thus if all rollers in first group at left above are re-run, some of them may actually be 0.50024 or 0.50025 and these may go either into the first or second group since they are right on the dividing point.

As can be seen in the background in Fig. 19, there are row upon row of these gaging machines, all working automatically. The operator need only keep the hopper loaded. From the gaging head, the rollers slide down a chute. Solenoid operated trap doors in this slide are controlled by the gaging head. As the roller slides down the chute, it encounters one of the trap doors which allows it to drop down a tube leading to one of the dust tight containers in which the individual tolerance groups are collected for selective assembly.

The sloping slide and the tubes leading to the individual containers can be seen clearly in Fig. 19. Note just above each container is an S-shaped casting in the lower end of the tube feeding it. These slow down the falling roller as it traverses the "S" so it will not strike other rollers in the container with possible damage to its highly finished working surface.

**Gaging Head:** Principle of operation of the gaging head, while simple, is extremely ingenious. Fig. 21 shows in simplified schematic form how the tapered surface of the roller is employed to mechanically amplify the diameter reading, similar to the cup and cone gaging setups. The holding device at A feeds the roller B into gaging ring D having a mating tapered surface at C that engages the tapered surface of the roller. It is evident that a roller with smaller nominal diameter at its midpoint will travel into the gaging ring farther than one with a larger diameter.

But A always advances the roller to the same fixed position. So any variation in amount of engagement with the gage ring D will show up by moving D to a different position, since D is free to slide between the guides H and H′ and is held against the roller B by a spring, not shown. Thus, the position of D can be used to measure the diameter of the roller.

This is done by mechanically linking the gage ring D with an electrical contacting reed F so F is made to engage one of the contacts at G, according to the position of D. These contacts in turn operate electric solenoids connected to trap doors in the chute down which the roller is discharged immediately after registering in the head. The whole system is carefully calibrated and maintained so that its accuracy is extremely high.

To prevent the reed F from engaging two contacts when the roller gages exactly on the dividing line between two tolerance groups, the reed end is shaped to a knife edge and a mechanism is incorporated to move it radially into the electric contacts through a series of other knife edges which separate the contacts. Thus, the reed cannot con-

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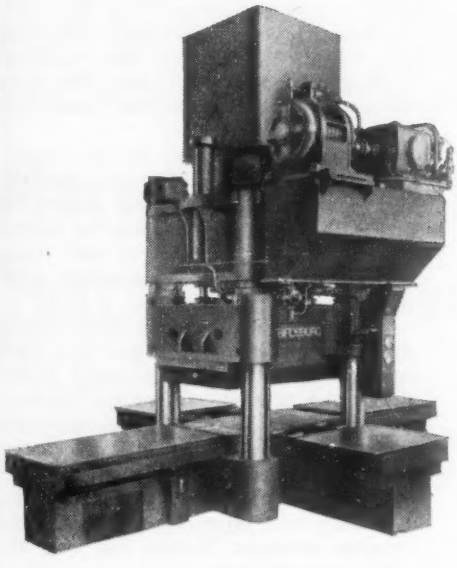

Because purchasing a hydraulic press is a major investment for even a large company, the trade mark is a vital key in making sure the investment is a sound one.

At Birdsboro, we like to think of the trade mark as symbolic of trained engineers constantly at work improving the designs of Birdsboro high speed presses to make them produce more parts per hour . . . to make them safer, easier to use . . . to make them cost less to maintain. Thousands of satisfied users in the aircraft and allied industries testify to our success in providing greater press value per dollar invested.

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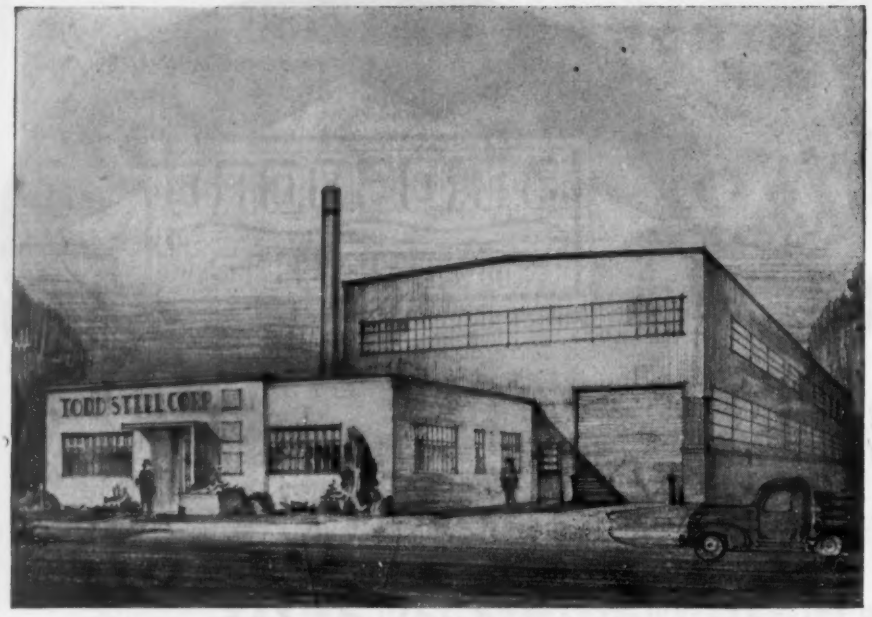


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tact more than a single point at a time.

Of course, diagram Fig. 21 is simplified for sake of illustrating the action. The actual machine employs a somewhat more complicated arrangement. Let's follow through the operation on the machine as illustrated in the close-up, Fig. 20. The tapered rollers are placed in a hopper fitted with a feed mechanism that sends them down the flexible tube A, Fig. 20, where the escapement and feed mechanism B causes the rollers to drop between two parallel knife edges C spaced just far enough apart to catch the big end of the roller, thus positioning them point down. At this point, any undersize rollers fall through the knife edges and down the chute D into separate containers.

As escapement B feeds an additional roller to the knife edges C, the lead roller already there is dropped down another flexible tube line E, from which point it is fed into the gaging ring at F. This action causes the slide carrying the gaging ring to assume a position depending upon the size of the roller, as was explained above in connection with the schematic, Fig. 21.

Through a mechanical linkage, this operates the reed G (Fig. 20) which selects a contact at H, causing one of the solenoids L to operate one of the trap doors in the chute R down which the roller is dropped as soon as the reed has made its contact selection. The trap door diverts the roller to the container holding other rollers of that same tolerance group. Rollers now go to assembly.

**Production of Cages:** In the assembled bearing, the rollers are properly spaced around the periphery by means of a cage which also confines the rollers so the entire set of rollers and inner race can be handled and installed on a machine as a single unit.

Cages are made from plain-carbon deep-drawing steel which has been cold rolled, annealed, pickled and oiled. Fairly thick stock is used. Cages are blanked, perforated and formed to exact shape desired. The edges which contact the rollers in the cage slots are then "winged" in press dies to exactly conform to the curvature and taper of the rolls, thus assuring minimum friction and long life with minimum wear.

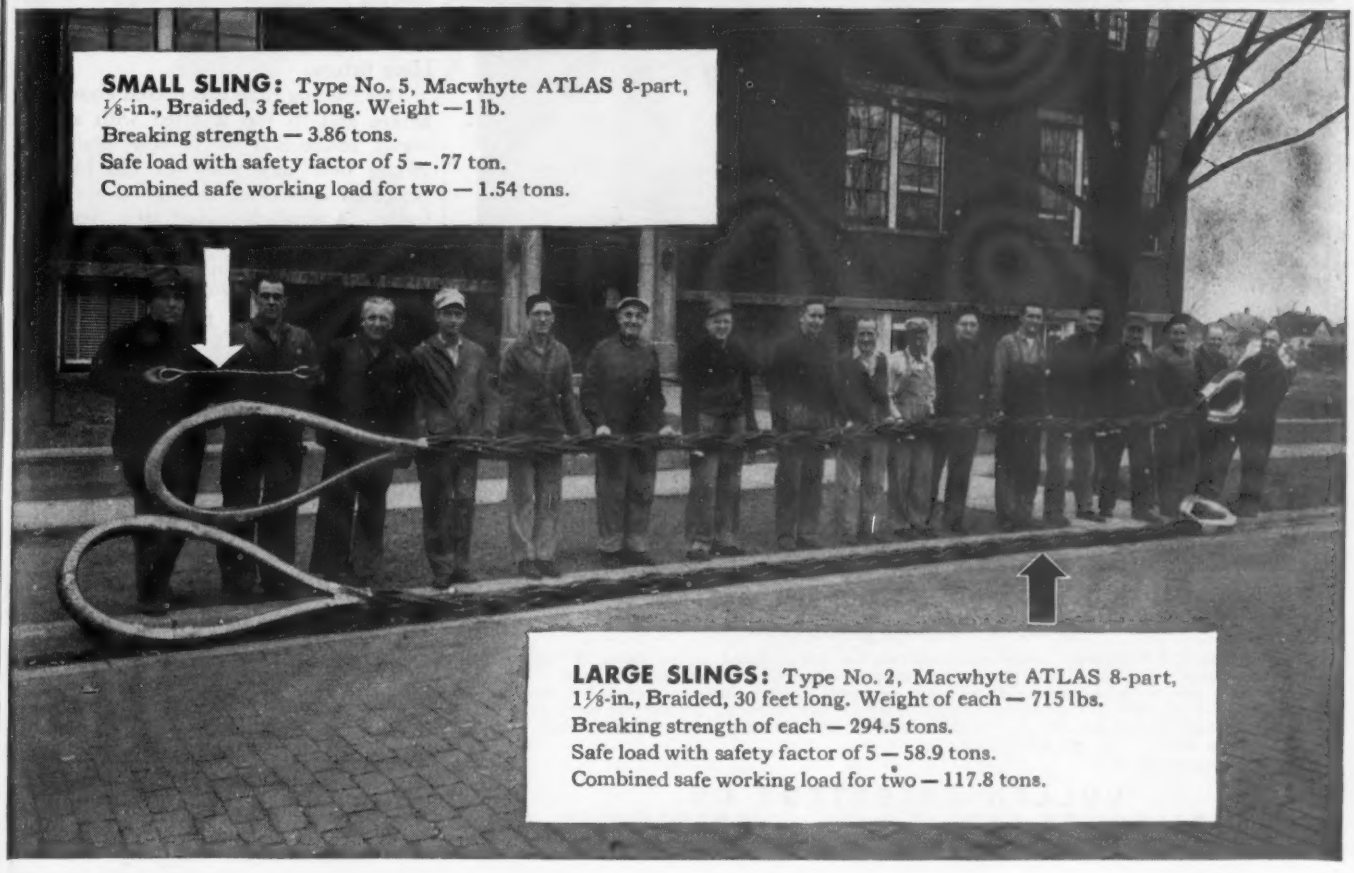
Much of this press work is done on high-speed automatic presses. Use is made of the special graphitic steels perfected by Timken engineers for dies. On a typical job, perforating slots in these cages, graphitic steel dies turned out 300,000 pieces where a set of high-grade tool steel dies produced only 10,000—a 30-to-1 performance ratio in favor of the Timken steel. Too, the finished product had a much better appearance due to less pickup and galling in the dies.

Cages are drawn to relieve stresses and are Parkerized to produce an excellent surface for holding lubricant and reducing wear.

**Assembly of Bearings:** With inner and outer races, rollers and cages accounted for, we are ready to see how they are

# WE MAKE 'EM LARGE OR SMALL!

***Here is a striking example of the different size slings made by Macwhyte***


**SMALL SLING:** Type No. 5, Macwhyte ATLAS 8-part, ⅛-in., Braided, 3 feet long. Weight — 1 lb.
Breaking strength — 3.86 tons.
Safe load with safety factor of 5 — .77 ton.
Combined safe working load for two — 1.54 tons.
**LARGE SLINGS:** Type No. 2, Macwhyte ATLAS 8-part, 1⅛-in., Braided, 30 feet long. Weight of each — 715 lbs.
Breaking strength of each — 294.5 tons.
Safe load with safety factor of 5 — 58.9 tons.
Combined safe working load for two — 117.8 tons.

# Macwhyte Slings Made in All Sizes to Meet Your Lifting Needs!

Whatever the load, you can get the right size Macwhyte Sling to handle it quickly, easily, safely. We can make one sling or any number of identical slings for you.

Many companies have adopted Macwhyte Slings as standard sling equipment. They anticipate their needs and place blanket orders, with shipments at regular intervals, insuring delivery of slings when they are required.

*Buy more War Bonds — hold what you have!*

**SEND FOR SLING LITERATURE!**

You can avoid production delays by ordering Macwhyte custom-built Slings in time to meet your needs. Ask for recommendations, prices and delivery. Mail your request for more information on your company letterhead. We will send you complete catalog and pictorial literature.

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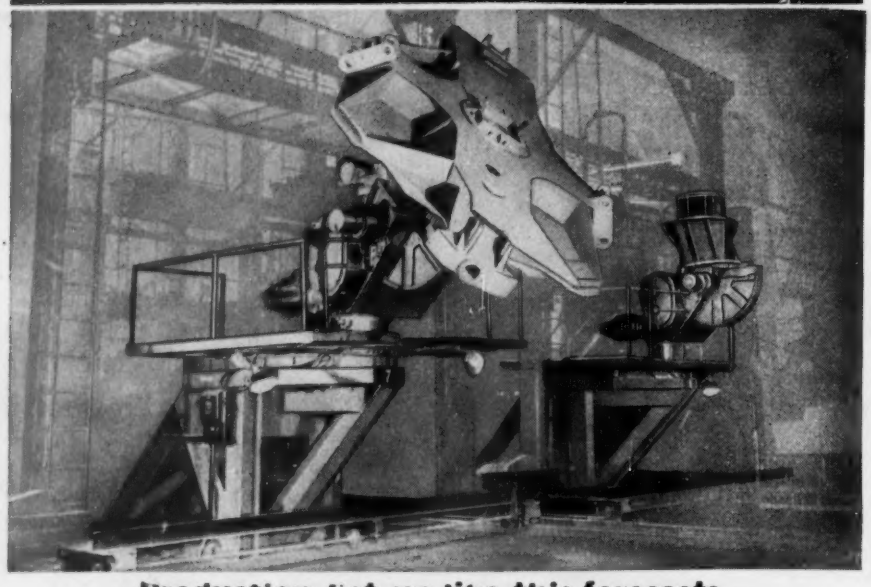
*"Lifting safety to new heights"*

***Macwhyte Wire Rope Slings are made to meet the capacity of any crane built***

# C-F POSITIONERS



**Production Set-up like this forecasts a new "shop practice"**

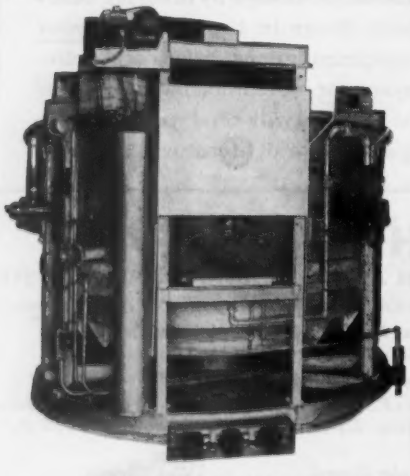
By welding on C-F Positioners, some manufacturers far out-produced all estimates of "possible" "War Production". Not only did this method increase out-put, it saved material and increased strength and quality while lowering the cost per unit. Under post-war competition automatic welding on C-F Positioners is certain to become standard manufacturing practice for many products. It is a new method that permits downhand welding of all sides and angles from a single set-up. A method you should know and understand.

*Write for Bulletin WP-22*

**CULLEN-FRIESTEDT CO.**
**1308 S. KILBOURN AVE. CHICAGO 23, ILL.**

# HAGAN

## ROTARY FORGE FURNACES



**PLUS** *features:*

- ★ HAGAN patented hearth construction keeps maintenance costs low, lost furnace time is negligible.
- ★ HAGAN method of firing with accurate time and temperature control — every billet forges the same, cold or burned steel is eliminated.
- ★ Lower fuel costs with HAGAN Rotary Hearth Furnaces, lower operating temperatures, less heating time, scale losses are lower.
- ★ HAGAN furnaces are charged and discharged at one central point, labor costs are therefore lower.
- ★ Die life is increased, constant uniformity of heated billets.

7' 0" Size. Billet — 2½" x 2½" x 4½". Billets per hour — 221. Pounds per hour — 1768. Used with #3 Maxipress.

***Write for informative technical bulletins.***

**GEORGE J. HAGAN COMPANY**
PITTSBURGH, PA.
DETROIT CHICAGO LOS ANGELES SAN FRANCISCO


assembled. Fig. 22 shows a typical set-up. Here the cages are fed down to the operating station from a sloping bin at extreme left. Rollers are fed down into bearing from an overhead hopper which automatically loads a vertical tube, in turn carrying the rollers to the assembling fixture.

This loading tube is centered above the fixture and its top is fitted with a universal connection so it may easily be swung over any point of the bearing periphery and there is aligned automatically. A small S-shaped strip mounted on the table just back of the fixture provides a rest point for the discharge end of loading tube when not in use.

Setup works as follows: Operator places the cage in a fixture resembling an outer bearing race; then removes discharge end of loading tube from rest point to periphery of race. As operator revolves cage by hand, rollers fall out end of tube into their slots in the cage. With cage filled, operator sets discharge end of loading tube back on the rest point, inserts an inner race or cone, picks up the cage with rollers and cone and places them in the open station of the automatic 2-station closing machine at right in Fig. 22.

As the machine table revolves, it carries the work under a die head and automatically raises the work to force the cone into position and close the cage in around the rollers, completing the assembly. Machine then ejects the assembly from the dies and an arm pushes it off onto the continuous belt conveyor seen in the foreground, Fig. 22.

After a series of inspection operations, the bearings are cleaned and slushed with a rust preventive. Unit is then packed and is ready to ship.

One of the interesting inspection operations is the noise test. Every bearing is run at high speed (for a short time) and in a setup like that shown in Fig. 23. This is done in specially soundproofed cells. To a trained ear, the sound of a running bearing tells much about the bearing. Thus, the operator can quickly detect an imperfect unit.

It is this unusual care in inspection, coupled with effective design and the use of hundreds of special machines found nowhere else that accounts for the outstanding performance of Timken tapered roller bearings.

## Authors of the Bug-Bomb Article

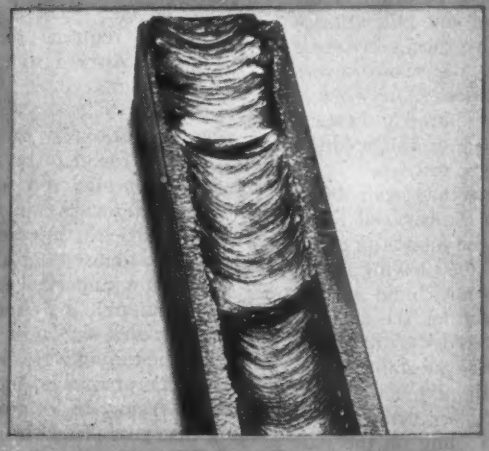
**Co-authors of the interesting article on production of "bug bombs" used to spray insecticide, which appeared in STEEL for June 25, Page 118, are P. W. Kohler and E. W. Ditsler, East Springfield, Mass. Works, Westinghouse Electric Corp. Due to an unfortunate oversight, the names of the authors were omitted when this issue of STEEL went to press.**

## SAYS THE MAN IN THE HELMET—

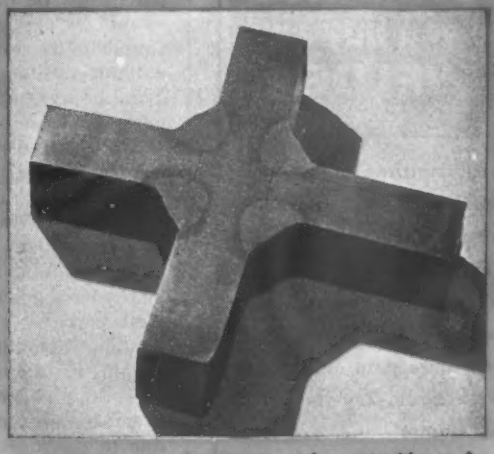
# "Here's something really hot! The new three-purpose AIRCO No. 315 Electrode . . .

*(AWS Classification E 6020)*

***"I use it for conventional fillet, deep fillet, and deep groove welding. It's a honey for all three jobs.***



"It takes plenty of juice and has a high burn-off rate and faster deposition, which makes it ideal for deep-fillet welding. The arc is steady and forceful and has a fine spraying action, with very low spatter loss."



"Passes are deeply convex at the root with good washup and no undercutting at the face. Penetration is medium with normal currents. It's excellent for all jobs where you need good appearance, high mechanical properties, and welds that will pass rigid X-Ray examination.

"Slag covers well and comes off easily. Airco No. 315 can be used with AC and with DC, straight or reverse polarity. You can use it for any job that calls for a 6020 or 6030 electrode."

This new electrode is a notable addition to the famous line of Airco electrodes. Whatever your welding need, there's a quality-proved Airco electrode for every requirement. Catalog No. 120 describes the complete line. Write for a free copy to your local Airco office, or to Dept. S. Address Air Reduction, General Offices: 60 East 42d St., New York 17, N.Y. In Texas, Magnolia Airco Gas Products Company, General Offices: Houston 1, Texas.

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HOBART'S "Arc Welding Design Service" is yours for the asking! FREE!

HOBART
"One of the World's Largest Builders of Arc Welders"

## Tube Fabrication

(*Concluded from Page* 118)

to 90 degrees on centerline radii as small as 3¼ in.

—Multiple bends, flaring, flanging, expanding, etc. to tolerances 50 per cent closer than previous commercial practice in the industry.

—Making short radius bends with practically no reduction of the inside diameter in the bend area and freedom from wrinkles, waves, scratches and minor fabricating marks.

On some of these parts, it is impossible to locate from either end of the tube after the first operation. Therefore, the first bend must be made to almost zero tolerances and all subsequent locating is from this point.

To prevent rust between operations, parts must be oiled, and in ordinary atmospheres enough dust and grit will accumulate to prevent further fabrication without cleaning. On the more severe mandrel-bending operations, a very heavy lubricating medium is required and means had to be developed to keep this medium free from steel particles, grit, etc.

If the inside diameter and wall thickness could be held to dimensional tolerance of 0.001-in. or if the fabricator could segregate tubes into lots having these dimensional tolerances and build a complete set of tools for each lot, the mandrel bending operation would be relatively simple. Either of these possibilities are, of course, commercially impractical and a satisfactory solution has been largely due to the ingenious tooling on the part of the fabricator plus unusual quality control on the part of the tube manufacturer.

Tooling for other operations, such as flanging, flaring, beading, expanding, spacing, indenting chamfering, etc., has required either new art or tools made to tolerances previously unheard of in tube fabricating work.

### Aircraft Exhaust Header

From the production of the cold rolled, stainless steel to the final operation on the fabricated aircraft exhaust header, consideration has to be given to the elimination of all minor defects, normally not considered harmful in tubular products. It is the primary unit in removing exhaust gases from a very large aircraft motor and hot spots must be guarded against regardless of costs. This tubular part, 2½ in. outside diameter by 0.049-in. wall thickness, made of 18-8 stabilized stainless, has proved to be another difficult fabricating job. After several years, its production is still limited to one tube producer, one fabricating subcontractor and one prime contractor.

Length of part before flanging is 10.90 in., plus 0.031-in. minus zero, face plate measurement. This means that any variation in degree of perpendicularity of faces is included in length tolerance. There are two bends in close proximity on a 4.219-in. centerline radius. The distance of straight tube on the short end is only 0.668-in. Tolerance on the outside diameter of the ends is plus or minus 0.005-in.

These extremely close limits give some indication of the difficulties the fabricating subcontractor faced. Special automatic hydraulically operated equipment had to be designed and built for the sizing and facing operations. On the two mandrel bends it was found that standard hydraulic benders could be used with specially designed tools. Dies, mandrels, wiper blocks, following blocks, etc., were designed to maintain full cross-sectional area in the bends. Normally this can be accomplished by a conventional balling operation after the bends. By this, is meant pushing a series of hardened balls through the part while it is held in the die.

However, due to the tendency of stainless steel to gall, and the requirement of freedom from internal marks or surface defects, it was decided to attempt to maintain the required sectional area on the benders. After design of several sets of experimental tools, this was accomplished.

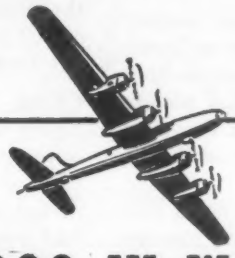
Bearing pressures in the hydraulic bender were found to be above anything previously encountered and had to be compensated for. Again, elimination of all steel particles, minute cutting burrs and grit and abrasives of all kinds became of paramount importance. It was found that even though the chemistry, physical properties, wall thickness and size tolerances of the tubing were closely controlled by the tube producers, there was enough variation from one lot to another—a lot being that part of one heat, welded, heat treated, etc., at one time—that each lot has to be kept separate through all fabricating operations and specially adjusted for on six of the operations.

In the prime contractor's plant, the finishing operations such as the welding on of fittings and collars, flanging, etc., are of a somewhat conventional nature, but due to dimensional and visual requirements, they are extremely difficult and require familiarity with the best stainless practices.

## Films Aid in Selecting Plastics

Technical film (No. 1) entitled "Bakelite Plastics—Selecting the Right Thermosetting Molding Material" considers the question of how to select proper thermosetting molding plastics to suit the product. Technical film (No. 2), "Bakelite Plastics—Product Design and Molding Technique for Thermosetting Plastics," presents fundamental principles for correct mold design and molding techniques for parts manufactured from thermosetting materials. Films are intended to guide in understanding proper uses of thermosetting plastics and to serve in training engineering students and plant personnel. Sixteen-millimeter prints are available without cost from Technical Film Library, Bakelite Corp., Unit of Union Carbide and Carbon Corp., 300 Madison avenue, New York 17.

# BRIGGS PREPARES FOR PEACETIME MANUFACTURING



## $626,000,000 IN WAR BUSINESS

| | |
|---|---|
| 51.7% FOR WAGES $323,640,000 | 2.16% FOR DIVIDENDS $13,520,000 |
| 34.32% TO SUPPLIERS $214,850,000 | 1.34% FOR DEPRECIATION $8,390,000 |
| 8.89% FOR TAXES $55,650,000 | .88% FOR RECONVERSION $5,500,000 |
| .71% LEFT IN BUSINESS $4,450,000 | |

Briggs has just completed $626,000,000 worth of war business—1941 through May 31, 1945—consisting principally of large aircraft assemblies, heavy bomber turrets and heavy and medium tank hulls. Its employment rose from 23,000 to 36,565 in the same period, and it added almost a million square feet of floor space to its manufacturing operations. Still on its books and in production are many more war orders.

### *Changes in War Requirements Free Space for Peacetime Work*

Now, however, due to changes in war requirements, facilities devoted to war work have been decreased about 20%, thus permitting the Company to continue to be able to meet its war contracts, and at the same time to begin to prepare for peacetime body manufacturing.

### *New Foundry Established In Cleveland*

The reduction in war work also permits Briggs to make postwar plans in other fields. For some time the Company has been experimenting with plaster molds. Beginning with April of last year, it put into operation on war work a large new foundry in Cleveland, Ohio, using plaster molds exclusively and licensed under what is known as the "Capaco Castings Process." This will soon be available for making intricate and fine castings for peacetime manufacturing.

### *Plans Laid for Postwar Plumbing Ware Market*

Briggs is also planning to re-enter the plumbing ware market on a large scale. On September 30, 1944 the John Douglas Company of Cincinnati, Ohio, was purchased—one of the country's oldest independent manufacturers of plumbing ware and plumbing fixtures. In securing this Company, Briggs has added enough plumbing ware facilities to what it already has so that it will be able, in the postwar market, to offer a complete line of plumbing ware for practically all purposes.

### *1944 Profits After Taxes Were $5,307,161.10*

Briggs' profits after taxes in 1944 and after provision for renegotiation of war contracts, costs of plant reconversion, and other costs arising from the war, were $5,307,161.10, as compared with $5,239,350.74 in 1943.

The consolidated financial position of the Company and its domestic subsidiaries on December 31, 1944 showed current assets of $82,647,409.64 and current liabilities of $54,303,994.08, as compared with current assets of $99,657,442.40 and current liabilities of $73,985,660.70 in 1943.

The Company paid a $2.00 dividend per share of stock in 1944, the same as in 1942 and 1943.

### *To Spend $10,000,000 On Reconversion*

Briggs' future plans call for the expenditure of approximately $10,000,000 for reconversion, re-equipping and new machinery. However, the Company believes that its principal job must continue to be production for war until final victory has been achieved in the Pacific. Until that time, the needs of the Armed Forces will always come first.

**BRIGGS MANUFACTURING COMPANY — DETROIT 14, MICHIGAN**

**IN WARTIME:**

BODIES FOR BOMBERS, FIGHTERS, TANKS AND AMBULANCES, AND BOMBER TURRETS.

**IN PEACETIME:**

BODIES FOR PASSENGER CARS AND TRUCKS, PLUMBING WARE, AND NON-FERROUS CASTINGS.

# THE BUSINESS TREND

## Strikes May Accentuate Production Downtrend

INDUSTRIAL activity, including steel ingot production which rose 2 percentage points, appeared well sustained in the latest week but there are indications that this display of firmness in the overall industrial picture is only a brief respite in the general slowing down of operations accompanying adjustment of the economy from a two-front to a one-front war basis.

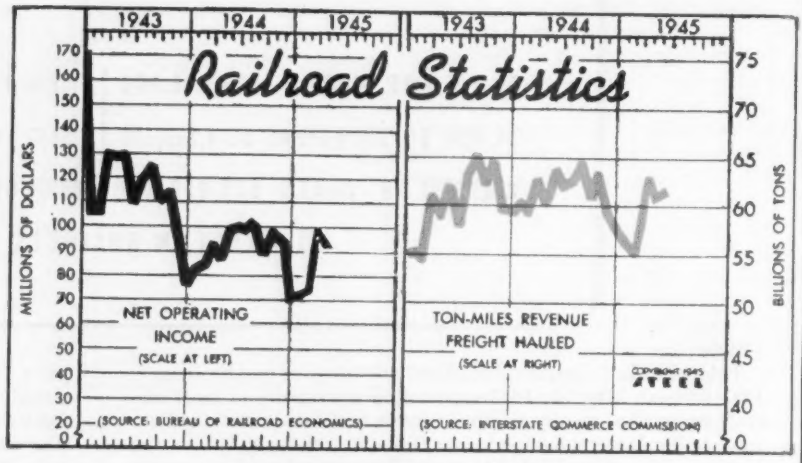
The decline in the various production indexes as cutbacks and terminations of war contracts become increasingly apparent is apt to become even more precipitate from strikes. Most of the recent labor disturbances have arisen as malignant growths from abnormal wartime employment conditions and the coddling of labor by the federal government in the last decade. As the nation continues to adjust from a two-front to a one-front war and later to peacetime it is possible that strikes in increasing numbers will plague industry as labor seeks to maintain high take-home wages despite reduced working hours. Appeals to workers' patriotism to stay on the job are likely to become less effective as the war goes into its closing phases and reconversion grows apace.

Although industries will proceed with reconversion as rapidly as possible they cannot maintain overall productivity while reconverting. Even after a plant is reconverted it may face production difficulties, for others on whom it depends for materials or parts still may be on war work. Thus with cutbacks and reconversion already bringing industrial production down from the high mark of the two-front war period, a wave of strikes could accentuate the drop.

**LIVING COSTS**—While labor is trying to maintain high take-home pay it gets additional strength for its arguments from the U. S. Department of Labor report that the cost of living in May was higher than it has been at any time in the past 12 months.

**COMMODITY PRICES**—Decline of 0.1 per cent in the Bureau of Labor Statistics index of commodity prices in the latest week for which data are available results from lower prices for agricultural commodities. However, the index is 2.1 per cent above the corresponding week of last year. Index of raw materials prices eased off 0.3 per cent in the latest week.

**COAL PRODUCTION**—Reduced output in the most recent week for which figures are available adds to the seriousness of the coal situation. Production is 22,301,000 tons or 7.2 per cent behind that for the corresponding period of last year, and it has been estimated that this fuel year's coal requirements will exceed output by 37 million tons.




**Statistics of Class I Railroads**

| | Net Operating Income | | | Ton-Miles Revenue Freight | | |
|---|---|---|---|---|---|---|
| | 1945 | 1944 | 1943 | 1945 | 1944 | 1943 |
| | (millions) | | | (billions) | | |
| Jan. | $73.0 | $84.9 | $105.3 | 56.8 | 60.5 | 55.1 |
| Feb. | 73.2 | 84.5 | 105.8 | 55.3 | 59.3 | 54.4 |
| March | 99.9 | 92.5 | 129.7 | 62.9 | 62.7 | 61.2 |
| April | 91.9 | 87.7 | 128.7 | 61.6 | 60.4 | 59.1 |
| May | ... | 98.5 | 129.5 | 63.4 | 64.0 | 62.1 |
| June | ... | 99.8 | 109.0 | ... | 62.0 | 58.0 |
| July | ... | 98.6 | 127.8 | ... | 62.8 | 63.7 |
| Aug. | ... | 101.4 | 132.5 | ... | 64.5 | 65.1 |
| Sept. | ... | 89.1 | 110.3 | ... | 61.0 | 62.5 |
| Oct. | ... | 97.3 | 113.1 | ... | 63.5 | 65.0 |
| Nov. | ... | 91.6 | 96.4 | ... | 59.4 | 59.9 |
| Dec. | ... | 69.8 | 76.9 | ... | 57.3 | 60.6 |
| Ave. | ... | $93.1 | $113.5 | ... | 61.5 | 60.6 |

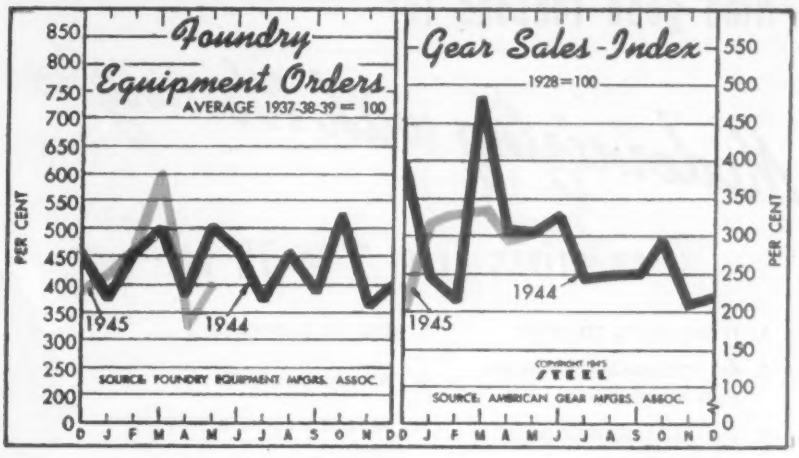
## FIGURES THIS WEEK

| INDUSTRY | Latest Period* | Prior Week | Month Ago | Year Ago |
|---|---|---|---|---|
| Steel Ingot Output (per cent of capacity) | 92 | 90 | 91.5 | 96 |
| Electric Power Distributed (million kilowatt hours) | 4,360† | 4,358 | 4,204 | 4,327 |
| Bituminous Coal Production (daily av.—1000 tons) | 1,957 | 1,975 | 1,969 | 1,978 |
| Petroleum Production (daily av.—1000 bbls.) | 4,860† | 4,898 | 4,859 | 4,587 |
| Construction Volume (ENR—unit $1,000,000) | $46.5 | $41.9 | $21.4 | $34.5 |
| Automobile and Truck Output (Ward's—number units) | 19,115 | 19,490 | 18,100 | 19,335 |
| **TRADE** | | | | |
| Freight Carloadings (unit—1000 cars) | 878† | 876 | 838 | 898 |
| Business Failures (Dun & Bradstreet, number) | 14† | 17 | 13 | 36 |
| Money in Circulation (in millions of dollars)‡ | $26,628 | $26,536 | $26,500 | $22,421 |
| Department Store Sales (change from like week a year ago)‡ | +19% | +14% | +1% | +3% |

*Dates on request.
†Preliminary. ‡Federal Reserve Board.

**Foundry Equipment Orders and Gear Sales**

| | Foundry Equipment Orders — Monthly Average (1937-38-39=100) | | | Gear Sales — Index (1928=100) | | |
|---|---|---|---|---|---|---|
| | 1945 | 1944 | 1943 | 1945 | 1944 | 1943 |
| Jan. | 422.4 | 442.8 | 429.8 | 323 | 246 | 268 |
| Feb. | 465.3 | 378.3 | 399.5 | 331 | 214 | 303 |
| Mar. | 604.7 | 498.4 | 562.7 | 339 | 485 | 334 |
| Apr. | 825.0 | 385.7 | 362.7 | 296 | 308 | 240 |
| May | 404.7 | 503.9 | 348.9 | 309 | 305 | 342 |
| June | .... | 466.1 | 413.6 | ... | 328 | 401 |
| July | .... | 375.8 | 379.4 | ... | 242 | 374 |
| Aug. | .... | 450.5 | 390.4 | ... | 247 | 312 |
| Sept. | .... | 388.0 | 346.6 | ... | 248 | 320 |
| Oct. | .... | 526.5 | 436.6 | ... | 293 | 368 |
| Nov. | .... | 369.5 | 388.0 | ... | 209 | 387 |
| Dec. | .... | 397.4 | 442.8 | ... | 219 | 387 |
| Ave. | .... | 428.9 | 440.8 | .. | 279 | 336 |


Foundry Equipment Orders
AVERAGE 1937-38-39 = 100
PER CENT
1945
1944
SOURCE: FOUNDRY EQUIPMENT MFGRS. ASSOC.
Gear Sales-Index
1928=100
1945
1944
SOURCE: AMERICAN GEAR MFGRS. ASSOC.
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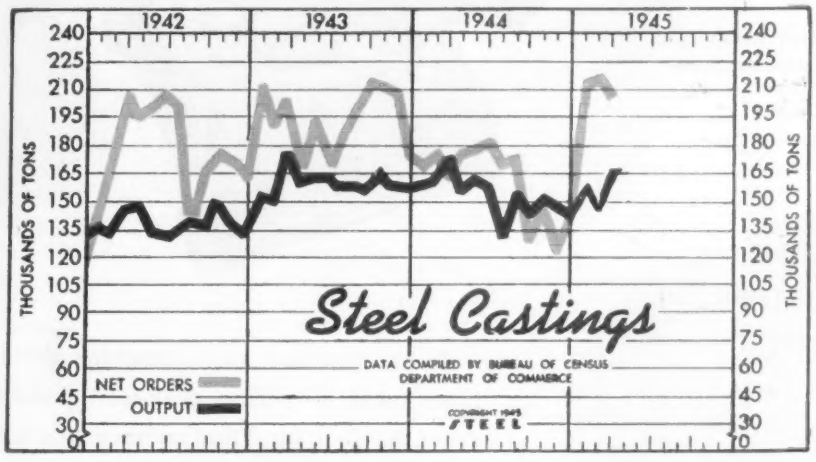
J F M A M J J A S O N D J F M A M J J A S O N D



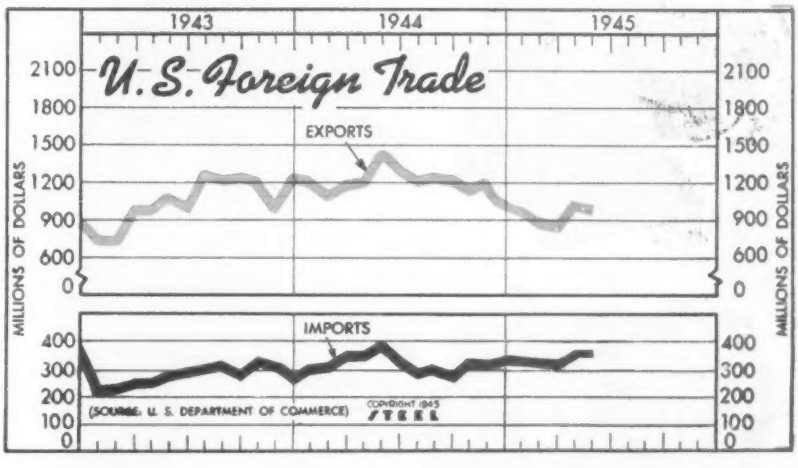

**Commercial Steel Castings†**
(Net tons in thousands)

| | Orders | | Production | |
|---|---|---|---|---|
| | 1945 | 1944 | 1945 | 1944 |
| Jan. | 210.2 | 167.7 | 157.2 | 159.8 |
| Feb. | 214.4 | 173.6 | 146.2 | 161.4 |
| Mar. | 203.2 | 162.6 | 166.9 | 174.6 |
| Apr. | .... | 175.1 | .... | 155.8 |
| May | .... | 177.0 | .... | 161.8 |
| June | .... | 181.8 | .... | 157.4 |
| July | .... | 169.9 | .... | 131.9 |
| Aug. | .... | 171.3 | .... | 154.9 |
| Sept. | .... | 129.8 | .... | 144.5 |
| Oct. | .... | 146.1 | .... | 150.7 |
| Nov. | .... | 120.7 | .... | 146.4 |
| Dec. | .... | 138.7 | .... | 144.2 |
| Total | .... | 159.5 | .... | 153.6 |

† For sale.

**Foreign Trade**
**Bureau of Foreign and Domestic Commerce**
(Unit Value—$1,000,000)

| | Exports | | | Imports | | |
|---|---|---|---|---|---|---|
| | 1945 | 1944 | 1943 | 1945 | 1944 | 1943 |
| Jan. | 900 | 1,124 | 730 | 334 | 300 | 228 |
| Feb. | 882 | 1,086 | 719 | 324 | 313 | 234 |
| Mar. | 881 | 1,197 | 988 | 324 | 359 | 249 |
| Apr. | 1,023 | 1,182 | 980 | 365 | 359 | 258 |
| May | 1,004 | 1,419 | 1,085 | 365 | 386 | 281 |
| June | .... | 1,271 | 1,002 | ... | 330 | 295 |
| July | .... | 1,198 | 1,262 | ... | 293 | 300 |
| Aug. | .... | 1,207 | 1,204 | ... | 302 | 315 |
| Sept. | .... | 1,199 | 1,235 | ... | 280 | 285 |
| Oct. | .... | 1,140 | 1,195 | ... | 327 | 329 |
| Nov. | .... | 1,184 | 1,074 | ... | 322 | 317 |
| Dec. | .... | 934 | 1,244 | ... | 336 | 281 |
| Total | ... | 14,102 | 12,716 | ... | 3,907 | 3,369 |




## FINANCE

| | Latest Period* | Prior Week | Month Ago | Year Ago |
|---|---|---|---|---|
| Bank Clearings (Dun & Bradstreet—millions) | $12,721 | $15,061 | $8,503 | $12,679 |
| Federal Gross Debt (billions) | $256.9 | $250.4 | $239.2 | $200.2 |
| Bond Volume, NYSE (millions) | $46.0 | $56.3 | $47.4 | $46.2 |
| Stocks Sales, NYSE (thousands) | 11,324 | 10,088 | 6,795 | 9,932 |
| Loans and Investments (billions)† | $63.0 | $58.9 | $57.5 | $51.2 |
| United States Gov't. Obligations Held (millions)† | $46,334 | $43,676 | $42,897 | $37,832 |

†Member banks, Federal Reserve System.

## PRICES

| | | | | |
|---|---|---|---|---|
| STEEL's composite finished steel price average | $58.27 | $58.27 | $58.27 | $56.73 |
| All Commodities† | 105.9 | 106.0 | 105.9 | 103.7 |
| Industrial Raw Materials† | 118.6 | 119.0 | 118.5 | 113.2 |
| Manufactured Products† | 102.0 | 102.0 | 102.1 | 101.1 |

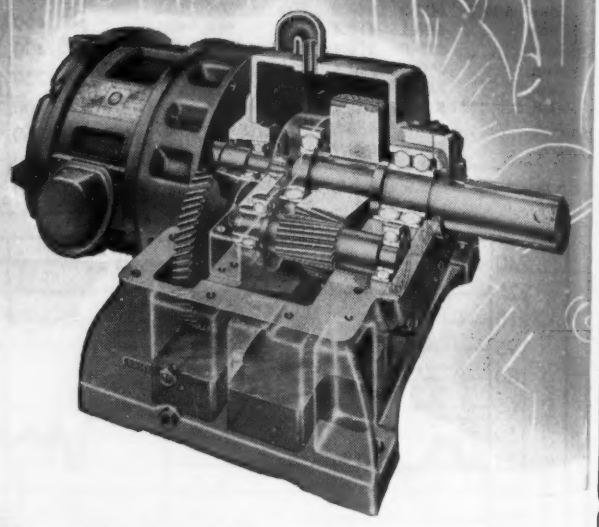
†Bureau of Labor's Index, 1926=100.

## Nine good reasons for

# *Modernizing with Westinghouse Gearmotors*

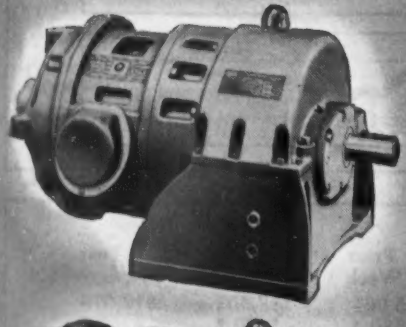
## on drives from 1 to 75 hp

1. FEWER PARTS TO WEAR
2. BPT "TOUGH-HARD" GEARS AND PINIONS
3. USE ALL WESTINGHOUSE MOTOR TYPES
4. HIGH EFFICIENCY
5. POSITIVE LUBRICATION
6. EASY ACCESSIBILITY
7. IMPROVED FOUNDATION STABILITY
8. MOTOR AND GEARS BUILT BY ONE MANUFACTURER
9. DESIGNED AND APPLIED TO A.G.M.A. STANDARDS

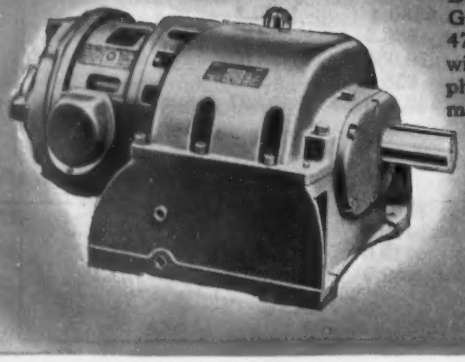


## There is a Westinghouse speed reduction unit for most applications

**TYPE A GEARMOTOR**—Single-reduction unit. Gear ratios 1.22, 1.50, 1.84, 2.24, 2.73, 3.37, 4.17, 5.00, 6.25. Available with single-phase, polyphase, and direct current motors.



**TYPE C GEARMOTOR**—Double-reduction unit. Gear ratios: 7.61, 9.21, 11.3, 14.0, 17.5, 20.8, 25.7. Available with single-phase, polyphase, and direct current motors.



**TYPE E GEARMOTOR**—Double-reduction unit. Gear ratios: 31.2, 38.9, 47.3, 52.7, 58.3. Available with single-phase, polyphase, and direct current motors.

In the last few years, machine drives have taken a terrific peak-load punishment. So it's natural that reconversion will require many replacements with modern, economical drives.

When drives require speed reduction... and four out of five do... use a gearmotor. Specifying gearmotors simplifies ordering and delivery... saves installation expense because the complete drive is in one "package".

Westinghouse offers a complete line of gearmotors for speed-reduction drives up to 75 hp, and a complete line of similar speed reducing units for drives up to 1000 hp. Call your Westinghouse Office for information, or write Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

J-07229

**Westinghouse**

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

*Gearmotors*

# WPB Seeks To Clear Mill Books of Duplicate Orders

***Users urged to cancel steel released by cutbacks . . . Effort to provide material for civilian products . . . Unrated orders increasing***

SEEKING to improve the situation existing on steel mill order books War Production Board has asked producers to report principal orders on their books to the end that duplicate contracts may be detected.

It has been apparent for some time that makers of civilian products have placed orders for the same steel with several mills, in the hope that they may obtain a place on rolling schedules. This has obscured the real situation and may have inflated backlogs materially. WPB hopes this action may make it possible to eliminate some duplications and give a truer picture of essential demand.

At the same time Washington is exerting heavy pressure on consumers who have received cutbacks, to cancel released tonnage. This is especially the case in sheets, which are in strong spot demand for drums and containers and other military needs, in addition to rated and unrated civilian programs scheduled for third and fourth quarter. To some extent bars are in a similar position. It is also reported that consideration is being given to revocation of Direction 70, Regulation 1, which permits manufacturers of civilian goods to divert tonnages released by military cutbacks to civilian requirements of like character. At present such diversion is subject to approval by WPB and it is proposed now that further steps be taken to the extent that tonnage be cancelled.

Although rated tonnage is declining, volume of unrated steel is increasing. In June some producers of diversified products received substantially heavier bookings than in May and in spite of cancellations attained a balance close to or exceeding shipments. In some products, notably sheets and pipe, the latter in special demand for bombs, total volume of validated and unvalidated orders, even after cutbacks, has been well in excess of shipments. However, unrated orders in general can not be firmly scheduled, because of priority of CMP tonnage and therefore are not reflected in delivery promises.

Major cutbacks have been in shells, but so far these have not caused much mill order cancellations and in any case they would not affect schedules much before fourth quarter. Chicago Ordnance District has announced a cutback in medium artillery ammunition components of about $20 million per month, involving storage and cartridge cases, containers, fuzes, primers and boosters. This appears to apply mainly to future schedules. It is understood this involves a number of contracts on which production has not yet started. Contractors under production are little affected.

Steelmaking operations last week dropped 3½ points to 88½ per cent, mainly due to strikes, in addition to some holiday observance. Cleveland receded 17 points to 76 per cent of capacity, Buffalo dropped 14 points to 79 per cent, Detroit 3 points to 80, Wheeling 10 points to 80½, Pittsburgh 1 point to 87, eastern Pennsylvania 4 points to 86 and Chicago 1 point to 94½ per cent. Cincinnati advanced 2 points to 91 and New England 1 point to 85. Rates were unchanged at Birmingham, 95, St. Louis, 75 and Youngstown 90 per cent.

Increasing strength appears in steelmaking scrap, with melters taking all offerings at ceiling prices and borings and turnings advancing steadily, now being generally only slightly below ceilings. Shipments are being made freely on contracts. Supply is good, but delay is experienced in yard preparation, because of continued labor shortage. No relief has appeared in cast scrap, demand for which is strong, because of tightness of pig iron.

With several blast furnace stacks being blown out for repairs the pig iron situation has tightened and production is no more than needed to meet demand.

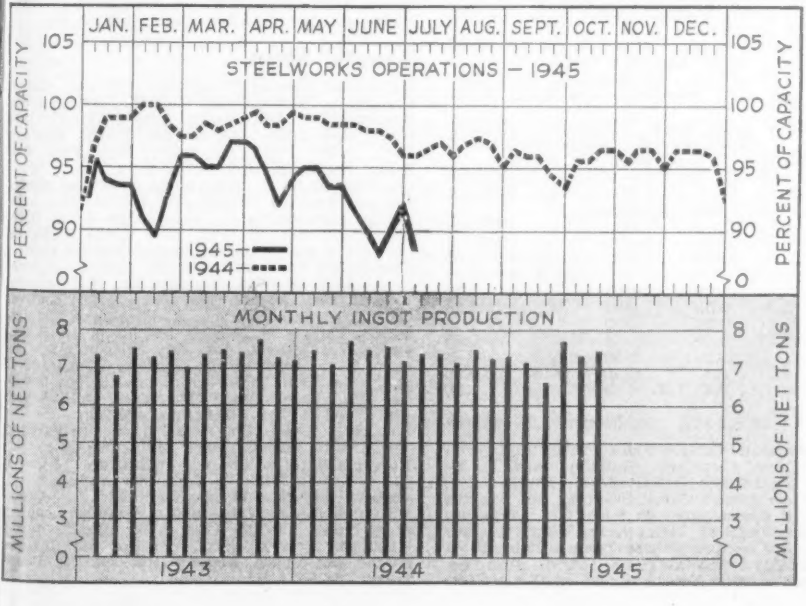
Average composite prices of steel and iron products are steady at ceilings, finished steel at $58.27, semifinished steel at $37.80, steelmaking pig iron at $24.05 and steelmaking scrap at $19.17.

## DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

| | Week Ended July 7 | Change | Same Week 1944 | Same Week 1943 |
|---|---|---|---|---|
| Pittsburgh | 87 | —1 | 88 | 91 |
| Chicago | 94.5 | —1 | 99.5 | 98.5 |
| Eastern Pa. | 86 | —4 | 95 | 93 |
| Youngstown | 90 | None | 96 | 94 |
| Wheeling | 80.5 | —10 | 101 | 86 |
| Cleveland | 76 | —17 | 92.5 | 90 |
| Buffalo | 79 | —14 | 90.5 | 93 |
| Birmingham | 95 | None | 95 | 95 |
| New England | 85 | +1 | 89 | 93 |
| Cincinnati | 91 | +2 | 72 | 92 |
| St. Louis | 75 | None | 79.5 | 95 |
| Detroit | 80 | —3 | 86 | 92 |
| Average | 88.5 | —3.5 | *96 | *92 |

*Based on steelmaking capacities as of these dates.



# COMPOSITE MARKET AVERAGES

| | July 7 | June 30 | June 23 | One Month Ago June, 1945 | Three Months Ago April, 1945 | One Year Ago July, 1944 | Five Years Ago July, 1940 |
|---|---|---|---|---|---|---|---|
| Finished Steel | $58.27 | $58.27 | $58.27 | $58.27 | $57.55 | $56.73 | $56.73 |
| Semifinished Steel | 37.80 | 37.80 | 37.80 | 36.45 | 36.00 | 36.00 | 36.00 |
| Steelmaking Pig Iron | 24.05 | 24.05 | 24.05 | 24.05 | 23.55 | 23.05 | 22.05 |
| Steelmaking Scrap | 19.17 | 19.17 | 19.17 | 19.07 | 19.17 | 19.17 | 18.65 |

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Averge for Last Month, Three Months and One Year Ago

| Finished Material | July 7, 1945 | June, 1945 | April, 1945 | July, 1944 |
|---|---|---|---|---|
| Steel bars, Pittsburgh | 2.25c | 2.25c | 2.15c | 2.15c |
| Steel bars, Chicago | 2.25 | 2.25 | 2.15 | 2.15 |
| Steel bars, Philadelphia | 2.57 | 2.57 | 2.47 | 2.47 |
| Shapes, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Shapes, Philadelphia | 2.215 | 2.215 | 2.215 | 2.215 |
| Shapes, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Pittsburgh | 2.25 | 2.25 | 2.20 | 2.10 |
| Plates, Philadelphia | 2.30 | 2.30 | 2.25 | 2.15 |
| Plates, Chicago | 2.25 | 2.25 | 2.20 | 2.10 |
| Sheets, hot-rolled, Pittsburgh | 2.20 | 2.20 | 2.20 | 2.10 |
| Sheets, cold-rolled, Pittsburgh | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Pittsburgh | 3.70 | 3.70 | 3.65 | 3.50 |
| Sheets, hot-rolled, Gary | 2.20 | 2.20 | 2.20 | 2.10 |
| Sheets, cold-rolled, Gary | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Gary | 3.70 | 3.70 | 3.65 | 3.50 |
| Bright bess., basic wire, Pittsburgh | 2.75 | 2.75 | 2.60 | 2.60 |
| Tin plate, per base box, Pittsburgh | $5.00 | $5.00 | $5.00 | $5.00 |
| Wire nails, Pittsburgh | 2.90 | 2.90 | 2.80 | 2.55 |

| Semifinished Material | | | | |
|---|---|---|---|---|
| Sheet bars, Pittsburgh, Chicago | $36.00 | $36.00 | $34.00 | $34.00 |
| Slabs, Pittsburgh, Chicago | 36.00 | 36.00 | 34.00 | 34.00 |
| Rerolling billets, Pittsburgh | 36.00 | 36.00 | 34.00 | 34.00 |
| Wire rods, No. 5 to 9/32-inch, Pitts. | 2.15 | 2.15 | 2.00 | 2.00 |

| Pig Iron | July 7, 1945 | June, 1945 | April, 1945 | July, 1944 |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $26.19 | $26.19 | $26.19 | $25.19 |
| Basic, Valley | 24.50 | 24.50 | 24.50 | 23.50 |
| Basic, eastern del. Philadelphia | 26.34 | 26.34 | 26.34 | 25.34 |
| No. 2 fdry., del. Pitts., N.&S. Sides | 25.69 | 25.69 | 25.69 | 24.69 |
| No. 2 foundry, Chicago | 25.00 | 25.00 | 25.00 | 24.00 |
| Southern No. 2, Birmingham | 21.38 | 21.38 | 21.38 | 20.38 |
| Southern No. 2 del. Cincinnati | 25.30 | 25.30 | 25.30 | 24.30 |
| No. 2 fdry., del. Phila. | 26.84 | 26.84 | 26.84 | 25.84 |
| Malleable, Valley | 25.00 | 25.00 | 25.00 | 24.00 |
| Malleable, Chicago | 25.00 | 25.00 | 25.00 | 24.00 |
| Lake Sup., charcoal, del. Chicago | 37.34 | 37.34 | 37.34 | 37.34 |
| Gray forge, del. Pittsburgh | 25.19 | 25.19 | 25.19 | 24.19 |
| Ferromanganese, del. Pittsburgh | 140.33 | 140.33 | 140.33 | 140.33 |

| Scrap | | | | |
|---|---|---|---|---|
| Heavy melting steel, No. 1 Pittsburgh | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt. steel, No. 2, E. Pa. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melting steel, Chicago | 18.75 | 18.45 | 18.75 | 18.75 |
| Rails for rolling, Chicago | 22.25 | 22.25 | 22.25 | 22.25 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 20.00 |

| Coke | | | | |
|---|---|---|---|---|
| Connellsville, furnace, ovens | $7.50 | $7.50 | $7.00 | $7.00 |
| Connellsville, foundry ovens | 8.25 | 8.25 | 7.75 | 7.75 |
| Chicago, by-product fdry., del. | 13.35 | 13.35 | 13.35 | 13.35 |

## STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

### Semifinished Steel

**Gross ton basis except wire rods, skelp.**

**Carbon Steel Ingots:** F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

**Alloy Steel Ingots:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

**Rerolling Billets, Blooms, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bil) $38; Pac. Ports, (bil) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

**Forging Quality Blooms, Slabs, Billets:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

**Open Hearth Shell Steel:** Pittsburgh Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles).

**Alloy Billets, Slabs, Blooms:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

**Sheet Bars:** Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

**Skelp:** Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

**Wire Rods:** Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—5/16 in. inclusive, per 100 lbs., $2.15. Do., over 5/16—47/64-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

### Bars

**Hot-Rolled Carbon Bars and Bar-Size Shapes under 3":** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c. (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

**Rail Steel Bars:** Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

**Hot-Rolled Alloy Bars:** Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

| AISI Series | (*Basic O-H) | AISI Series | (*Basic O-H) |
|---|---|---|---|
| 1300 | $0.10 | 4100 (.15-.25 Mo) | 0.70 |
| | | (.20-.30 Mo) | 0.75 |
| 2300 | 1.70 | 4300 | 1.70 |
| 2500 | 2.55 | 4600 | 1.20 |
| 3000 | 0.50 | 4800 | 2.15 |
| 3100 | 0.85 | 5100 | 0.35 |
| 3200 | 1.35 | 5130 or 5152 | 0.45 |
| 3400 | 3.20 | 6120 or 6152 | 0.95 |
| 4000 | 0.45-0.55 | 6145 or 6150 | 1.20 |

*Add 0.25 for acid open-hearth; 0.50 electric.

**Cold-Finished Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

**Cold-Finished Alloy Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

**Reinforcing Bars (New Billet):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

**Reinforcing Bars (Rail Steel):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

**Iron Bars:** Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

### Sheets, Strip

**Hot-Rolled Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

**Cold-Rolled Sheets:** Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

**Galvanized Sheets, No. 24:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

**Corrugated Galv. Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

**Culvert Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

**Enameling Sheets: 10-gage:** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

**Electrical Sheets No. 24:**

| | Pittsburgh Base | Pacific Ports | Granite City |
|---|---|---|---|
| Field grade | 3.30c | 4.05c | 3.30c |
| Armature | 3.65c | 4.40c | 3.75c |
| Electrica | 4.15c | 4.90c | 4.25c |
| Motor | 5.05c | 5.80c | 5.15c |
| Dynamo | 5.75c | 6.50c | 5.85c |
| Transformer | | | |
| 72 | 6.25c | 7.00c | ..... |
| 65 | 7.25c | 8.00c | ..... |
| 58 | 7.75c | 8.50c | ..... |
| 52 | 8.55c | 9.30c | ..... |

**Hot-Rolled Strip:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

**Cold Rolled Strip:** Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

**Commodity C. R. Strip:** Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

**Cold-Finished Spring Steel:** Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

## Tin, Terne Plate

**Tin Plate:** Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

**Electrolytic Tin Plate:** Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

**Tin Mill Black Plate:** Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

**Long Ternes:** Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

**Manufacturing Ternes: (Special Coated)** Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

**Roofing Ternes:** Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

## Plates

**Carbon Steel Plates:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points, Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

**Floor Plates:** Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

**Open-Hearth Alloy Plates:** Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

**Wrought Iron Plates:** Pittsburgh, 3.80c.

## Shapes

**Structural Shapes:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

**Steel Sheet Piling:** Pittsburgh, Chicago, Buffalo, 2.40c.

## Wire Products, Nails

**Wire:** Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire ..... 2.75c
Spring wire ..... 3.35c
(Pittsburgh Steel Co., 0.20c higher.)

**Wire Products to the Trade:**

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pac. ports ..... $3.40 and $3.05
Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland ..... 3.20c
Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland ..... 3.55c
Woven fence, 15½ gage and heavier, per base column ..... .67c
Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire column 70.

## Tubular Goods

**Welded Pipe:** Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

**Butt Weld**

| In. | Steel Blk. | Steel Galv. | In. | Iron Blk. | Iron Galv. |
|---|---|---|---|---|---|
| ⅛ | 56 | 33 | ½ | 24 | 3½ |
| ¼ & ⅜ | 59 | 40½ | ⅝ | 30 | 10 |
| ½ | 63½ | 51 | 1-1¼ | 34 | 16 |
| ¾ | 66½ | 55 | 1½ | 38 | 18½ |
| 1-3 | 68½ | 57½ | 2 | 37½ | 18 |

**Lap Weld**

| In. | Steel Blk. | Steel Galv. | In. | Iron Blk. | Iron Galv. |
|---|---|---|---|---|---|
| 2 | 61 | 49½ | 1¼ | 23 | 3½ |
| 2½-3 | 64 | 54½ | 1½ | 28½ | 10 |
| 3½-6 | 66 | 54½ | 2 | 30½ | 12 |
| 7-8 | 65 | 52½ | 2½, 3½ | 31½ | 14½ |
| 9-10 | 64½ | 52 | 4 | 33½ | 18 |
| 11-12 | 63½ | 51 | 4½-8 | 32½ | 17 |
| | | | 9-12 | 28½ | 12 |

**Boiler Tubes:** Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

| O.D. Sizes | B.W.G | —Seamless— Hot Rolled | Cold Drawn | —Lap Weld— Steel | Charcoal Iron |
|---|---|---|---|---|---|
| 1" | 13 | $ 7.82 | $ 9.01 | ..... | ..... |
| 1¼" | 13 | 9.26 | 10.67 | ..... | ..... |
| 1½" | 13 | 10.23 | 11.72 | $ 9.72 | $23.71 |
| 1¾" | 13 | 11.64 | 13.42 | 11.06 | 22.93 |
| 2" | 13 | 13.04 | 15.03 | 12.38 | 19.35 |
| 2¼" | 13 | 14.54 | 16.76 | 13.79 | 21.63 |
| 2¼" | 12 | 16.01 | 18.45 | 15.16 | ..... |
| 2½" | 12 | 17.54 | 20.21 | 16.58 | 26.57 |
| 2¾" | 12 | 18.59 | 21.42 | 17.54 | 29.00 |
| 3" | 12 | 19.50 | 22.48 | 18.35 | 31.38 |
| 3½" | 11 | 24.63 | 28.37 | 23.15 | 39.81 |
| 4" | 10 | 30.54 | 35.20 | 28.66 | 49.90 |
| 4½" | 10 | 37.35 | 43.04 | 35.22 | ..... |
| 5" | 9 | 46.87 | 54.01 | 44.25 | 73.93 |
| 6" | 7 | 71.96 | 82.93 | 68.14 | ..... |

## Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base. Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

## Tool Steels

**Tool Steels:** Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

| Tung. | Chr. | Van. | Moly. | Pitts. base per lb. |
|---|---|---|---|---|
| 18.00 | 4 | 1 | . | 67.00c |
| 1.5 | 4 | 1 | 8.5 | 54.00c |
| ..... | 4 | 2 | 8 | 54.00c |
| 5.50 | 4 | 1.50 | 4 | 57.50c |
| 5.50 | 4.50 | 4 | 4.50 | 70.00c |

## Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

| Type | Bars | Plates | Sheets | H. R. Strip | C. R. Strip |
|---|---|---|---|---|---|
| **CHROMIUM NICKEL STEEL** | | | | | |
| 302 | 24.00c | 27.00c | 34.00c | 21.50c | 28.00c |
| 303 | 26.00 | 29.00 | 36.00 | 27.00 | 33.00 |
| 304 | 25.00 | 29.00 | 36.00 | 23.50 | 30.00 |
| 308 | 29.00 | 34.00 | 41.00 | 28.50 | 35.00 |
| 309 | 36.00 | 40.00 | 47.00 | 37.00 | 47.00 |
| 310 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 312 | 36.00 | 40.00 | 48.00 | ..... | ..... |
| *316 | 40.00 | 44.00 | 48.00 | 40.00 | 48.00 |
| †321 | 29.00 | 34.00 | 41.00 | 29.25 | 38.00 |
| ‡347 | 33.00 | 38.00 | 45.00 | 33.00 | 42.00 |
| 431 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| **STRAIGHT CHROMIUM STEEL** | | | | | |
| 403 | 21.50 | 24.50 | 29.50 | 21.25 | 27.00 |
| **410 | 18.50 | 21.50 | 26.50 | 17.00 | 22.00 |
| 416 | 19.00 | 22.00 | 27.00 | 18.25 | 23.50 |
| ††420 | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 430 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| ‡‡430F | 19.50 | 22.50 | 29.50 | 18.75 | 24.50 |
| 440A | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 442 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 443 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 446 | 27.50 | 30.50 | 36.50 | 35.00 | 52.00 |
| 501 | 8.00 | 12.00 | 15.75 | 12.00 | 17.00 |
| 502 | 9.00 | 13.00 | 16.75 | 13.00 | 18.00 |
| **STAINLESS CLAD STEEL (20%)** | | | | | |
| 304 | ..... | §§18.00 | 19.00 | ..... | ..... |

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

**Basing Point Prices** are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

**Delivered prices** applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

**Domestic Ceiling prices** are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

**Seconds, maximum prices:** flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

**Export ceiling prices** may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

## Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

**Carriage and Machine**

½ x 6 and smaller ..... 65⅓ off
Do., ⅜ and ⅝ x 6-in. and shorter ..... 63½ off
Do., ¾ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

**Stove Bolts**

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

**Nuts**

| Semifinished hex | U.S.S | S A E |
|---|---|---|
| ⅞-inch and less | 62 | 64 |
| 1-1-inch | 59 | 60 |
| 1⅛-1½-inch | 57 | 58 |
| 1⅝ and larger | 56 | |

**Hexagon Cap Screws**

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

**Square Head Set Screws**

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

## Piling

Pittsburgh, Chicago, Buffalo ..... 2.40c

## Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural ..... 3.75c
½-inch and under ..... 65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ... $2.75-3.00 off

## Metallurgical Coke

Price Per Net Ton

**Beehive Ovens**

Connellsville, furnace ..... *7.50
Connellsville, foundry ..... 8.00- 8.50
New River, foundry ..... 9.00- 9.25
Wise county, foundry ..... 7.75- 8.25
Wise county, furnace ..... 7.25- 7.75

**By-Product Foundry**

Kearney, N. J., ovens ..... 12.00
Chicago, outside delivered ..... 12.00
Chicago, delivered ..... 13.30
Terre Haute, delivered ..... 13.10
Milwaukee, ovens ..... 13.30
New England, delivered ..... 14.
St. Louis, delivered ..... †13.30
Birmingham, delivered ..... 10.
Indianapolis, delivered ..... 13.10
Cincinnati, delivered ..... 12.80
Cleveland, delivered ..... 14.80
Buffalo, delivered ..... 17.
Detroit, delivered ..... 13.30
Philadelphia, delivered ..... 12.

*Operators of hand-drawn ovens using cracked coal may charge $8.00, effective May 26, 1945. †13.85 from other than Ala., Md., Penn.

## Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol ..... 15.00c
Toluol, two degree ..... 28.00c
Solvent naphtha ..... 27.00c
Industrial xylol ..... 27.00c

Per lb. f.o.b. works

Phenol (car lots, returnable drums) ... 12.50c
Do., less than car lots ..... 13.25c
Do., tank cars ..... 11.25c

Eastern Plants, per lb

Naphthalene flakes, balls, bbls., to jobbers ..... 8.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia ..... $29.25

# WAREHOUSE STEEL PRICES

**Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.**

| | Hot rolled bars | Structural shapes | Plates | Floor plates | Hot rolled sheets (10 gage base) | Hot rolled bands (12 gage and heavier) | Hot rolled hoops (14 gage and lighter) | Galvanized flat sheets (24 gage base) | Cold-rolled sheets (17 gage base) | Cold finished bars | Cold-rolled strip | NE hot bars 8600 series | NE hot bars 9400 series |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Boston** | 4.044[1] | 3.912[1] | 3.912[1] | 5.727[1] | 3.774[1] | 4.106[1] | 5.106[1] | 5.224[14] | 4.744[14] | 4.144[11] | 4.715 | 6.012[28] | 6.012[28] |
| New York | 3.853[1] | 3.758[1] | 3.768[1] | 5.574[1] | 3.590[1] | 3.974[1] | 3.974[1] | 5.010[13] | 4.613[14] | 4.103[21] | 4.774 | ..... | ..... |
| Jersey City | 3.853[1] | 3.747[1] | 3.768[1] | 5.574[1] | 3.590[1] | 3.974[1] | 3.974[1] | 5.010[13] | 4.613[14] | 4.103[21] | 4.774 | ..... | ..... |
| Philadelphia | 3.822[1] | 3.666[1] | 3.605[1] | 5.272[1] | 3.518[1] | 3.922[1] | 4.272[1] | 5.018[15] | 4.872[25] | 4.072[21] | 4.772 | 5.816[28] | 5.860[28] |
| Baltimore | 3.802[1] | 3.759[1] | 3.594[1] | 5.252[1] | 3.394[1] | 3.902[1] | 4.252[1] | 4.894[1] | 4.852[25] | 4.052[21] | ..... | ..... | ..... |
| **Washington** | 3.941[1] | 3.930[1] | 3.796[1] | 5.341[1] | 3.596[1] | 4.041[1] | 4.391[1] | 5.196[17] | 4.841[26] | 4.041[21] | ..... | ..... | ..... |
| Norfolk, Va. | 4.065[1] | 4.002[1] | 3.971[1] | 5.465[1] | 3.771[1] | 4.165[1] | 4.515[1] | 5.371[27] | 4.965[24] | 4.165[21] | ..... | ..... | ..... |
| Bethlehem, Pa.* | ..... | 3.45[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Claymont, Del.* | ..... | ..... | 3.45[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Coatesville, Pa.* | ..... | ..... | 3.45[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| **Buffalo (city)** | 3.35[1] | 3.40[1] | 3.63[1] | 5.26[1] | 3.35[1] | 3.819[1] | 3.819[1] | 4.75[15] | 4.40[10] | 3.75[21] | 4.669 | 5.60[28] | 5.75[28] |
| Buffalo (country) | 3.25[1] | 3.30[1] | 3.30[1] | 4.90[1] | 3.25[1] | 3.81[1] | 3.50[1] | 4.65[15] | 4.30[10] | 3.65[21] | 4.35 | 5.60[28] | 5.75[28] |
| Pittsburgh (city) | 3.35[1] | 3.40[1] | 3.40[1] | 5.00[1] | 3.35[1] | 3.60[1] | 3.60[1] | 4.75[12] | 4.40[24] | 3.75[21] | ..... | ..... | ..... |
| Pittsburgh (country) | 3.25[1] | 3.30[1] | 3.30[1] | 4.90[1] | 3.25[1] | 3.50[1] | 3.50[1] | 4.65[12] | 4.30[24] | 3.65[21] | ..... | ..... | ..... |
| Cleveland (city) | 3.35[1] | 3.588[1] | 3.40[1] | 5.188[1] | 3.35[1] | 3.60[1] | 3.60[1] | 4.877[12] | 4.40[24] | 3.75[21] | 4.45[31] | 5.60[28] | 5.65[28] |
| Cleveland (country) | 3.25[1] | ..... | 3.30[1] | ..... | 3.25[1] | 3.50[1] | 3.50[1] | ..... | 4.30[24] | 3.65[21] | 4.35[31] | ..... | ..... |
| Detroit | 3.450[1] | 3.661[1] | 3.609[1] | 5.281[1] | 3.450[1] | 3.700[1] | 3.700[1] | 5.000[12] | 4.500[24] | 3.800[21] | 4.659 | 5.93[28] | 5.98[28] |
| Omaha (city, delivered) | 4.115[1] | 4.165[1] | 4.165[1] | 5.765[1] | 3.865[1] | 4.215[1] | 4.215[1] | 5.608[19] | 5.443[24] | 4.443[12] | ..... | ..... | ..... |
| Omaha (country, base) | 4.015[1] | 4.065[1] | 4.065[1] | 5.665[1] | 3.765[1] | 4.115[1] | 4.115[1] | 5.508[19] | ..... | ..... | ..... | ..... | ..... |
| Cincinnati | 3.611[1] | 6.391[1] | 3.661[1] | 5.291[1] | 3.425[1] | 3.675[1] | 3.675[1] | 4.825[12] | 4.475[24] | 4.011[21] | 4.711 | 6.10 | 6.20 |
| Youngstown, O.* | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4.40[12] | ..... | ..... | ..... | ..... | ..... |
| Middletown, O.* | ..... | ..... | ..... | ..... | 3.25[1] | 3.50[1] | 3.50[1] | 4.65[12] | ..... | ..... | ..... | ..... | ..... |
| Chicago (city) | 3.50[1] | 3.55[1] | 3.55[1] | 5.15[1] | 3.25[1] | 3.60[1] | 3.60[1] | 5.231[15] | 4.20[24] | 3.75[21] | 4.65 | 5.75[28] | 5.85[28] |
| Milwaukee | 3.637[1] | 3.687[1] | 3.687[1] | 5.287[1] | 3.387[1] | 3.737[1] | 3.737[1] | 5.272[15] | 4.337[24] | 3.887[21] | 4.787 | 5.987[28] | 6.087[28] |
| Indianapolis | 3.58[1] | 3.63[1] | 3.63[1] | 5.23[1] | 3.518[1] | 3.768[1] | 3.768[1] | 4.918[15] | 4.568[24] | 3.98[21] | 4.78 | 6.08[28] | 6.18[28] |
| **St. Paul** | 3.76[3] | 3.81[3] | 3.81[3] | 5.41[3] | 3.51[3] | 3.86[3] | 3.86[3] | 5.257[15] | 4.46[24] | 4.361[21] | 5.102 | 6.09[28] | 6.19[28] |
| St. Louis | 3.647[1] | 3.697[1] | 3.697[1] | 5.297[1] | 3.397[1] | 3.747[1] | 3.747[1] | 5.172[15] | 4.347[24] | 4.031[21] | 4.931 | 6.131[28] | 6.231[28] |
| Memphis, Tenn. | 4.015[5] | 4.065[5] | 4.065[5] | 5.78[5] | 3.965[5] | 4.215[5] | 4.215[5] | 5.265[15] | 4.78[24] | 4.33[21] | ..... | ..... | ..... |
| Birmingham | 3.50[1] | 3.55[1] | 3.55[1] | 5.903[1] | 3.45[1] | 3.70[1] | 3.70[1] | 4.75[15] | 4.852[24] | 4.54 | 5.215 | ..... | ..... |
| New Orleans (city) | 4.10[4] | 3.90[4] | 3.90[4] | 5.85[4] | 4.058[4] | 4.20[4] | 4.20[4] | 5.25[16] | 5.079[10] | 4.60[21] | 5.429 | ..... | ..... |
| **Houston, Tex.** | 3.75[3] | 4.25[3] | 4.25[3] | 5.50[3] | 3.763[3] | 4.318[3] | 4.318[3] | 5.313[16] | 4.10[10] | 3.65[22] | ..... | ..... | ..... |
| Los Angeles | 4.40[4] | 4.65[4] | 4.95[4] | 7.20[4] | 5.00[4] | 4.95[4] | 6.75[4] | 6.00[13] | 7.20[4] | 5.583[22] | 5.613 | 5.85[28] | 5.95[28] |
| San Francisco | 4.15[7] | 4.35[7] | 4.65[7] | 6.35[7] | 4.55[7] | 4.50[7] | 5.75[7] | 6.35[15] | 7.30[15] | 5.333[21] | 7.333 | 8.304[28] | 8.404[28] |
| Portland, Oreg. | 4.45[27] | 4.45[27] | 4.75[27] | 6.50[27] | 4.65[27] | 4.75[27] | 6.30[27] | 5.75[15] | 6.60[15] | 5.533[15] | ..... | ..... | ..... |
| Tacoma | 4.35[6] | 4.45[6] | 4.75[6] | 6.50[6] | 4.65[6] | 4.25[6] | 5.45[6] | 5.95[15] | 7.60[15] | 5.783[21] | ..... | ..... | 8.00[28] |
| Seattle | 4.35[6] | 4.45[6] | 4.75[6] | 6.50[6] | 4.65[6] | 4.25[6] | 5.45[6] | 5.95[15] | 7.05[15] | 5.783[21] | ..... | ..... | 8.00[28] |

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

### BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 1999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

## Ores

**Lake Superior Iron Ore**

*Gross ton. 51½% (Natural) Lower Lake Ports*

| | |
|---|---|
| Old range bessemer | $4.75 |
| Mesabi nonbessemer | 4.45 |
| High phosphorus | 4.35 |
| Mesabi bessemer | 4.60 |
| Old range nonbessemer | 4.60 |

**Eastern Local Ore**

*Cents, units, del. E. Pa.*

| | |
|---|---|
| Foundry and basic 56-63% contract | 13.00 |

**Foreign Ore**

*Cents per unit, c.i.f. Atlantic ports*

| | |
|---|---|
| Manganiferous ore, 45-55% Fe., 6-10% Mang. | Nom. |
| N. African low phos. | Nom. |
| Spanish, No. African basic, 50 to 60% | Nom. |
| Brazil iron ore, 65-69% f.o.b. Rio de Janeiro | 7.50-8.00 |

**Tungsten Ore**

| | |
|---|---|
| Chinese wolframite, per short ton unit, duty paid | $24.00 |

**Chrome Ore**

(Equivalent OPA schedules):

*Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.*

*(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)*

Indian and African

| | |
|---|---|
| 48% 2.8:1 | $41.00 |
| 48% 3:1 | 43.50 |
| 48% no ratio | 31.00 |

South African (Transvaal)

| | |
|---|---|
| 44% no ratio | $27.40 |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 50% no ratio | 32.80 |

Brazilian—nominal

| | |
|---|---|
| 44% 2.5:1 lump | 33.65 |
| 48% 3:1 lump | 43.50 |

Rhodesian

| | |
|---|---|
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 48% 3:1 lump | 43.50 |

Domestic (seller's nearest rail)

| | |
|---|---|
| 48% 3:1 | 52.80 |
| less $7 freight allowance | |

**Manganese Ore**

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

**Molybdenum**

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

## NATIONAL EMERGENCY STEELS (Hot Rolled)

*(Extras for alloy content)*

| Designation | Chemical Composition Limits, Per Cent — Carbon | Mn. | Si. | Cr. | Ni. | Mo. | Basic open-hearth Electric furnace Bars per 100 lb. | Billets per GT | Bars per 100 lb. | Billets per GT |
|---|---|---|---|---|---|---|---|---|---|---|
| NE 8612 | .10-.15 | .70-.90 | .20-.35 | .40-.60 | .40-.70 | .15-.25 | $0.65 | $13.00 | $1.15 | $23.00 |
| NE 8720 | .18-.23 | .70-.90 | .20-.35 | .40-.60 | .40-.70 | .20-.30 | .70 | 14.00 | 1.20 | 24.00 |
| NE 9415 | .13-.18 | .80-1.10 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9425 | .23-.28 | .80-1.20 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | .75 | 15.00 | 1.25 | 25.00 |
| NE 9442 | .40-.45 | 1.00-1.30 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9722 | .20-.25 | .50-.80 | .20-.35 | .10-.25 | .40-.70 | .15-.25 | .65 | 13.00 | 1.15 | 23.00 |
| NE 9830 | .28-.33 | .70-.90 | .20-.35 | .70-.90 | .85-1.15 | .20-.30 | 1.30 | 26.00 | 1.80 | 36.00 |
| NE 9912 | .10-.15 | .50-.70 | .20-.35 | .40-.60 | 1.00-1.30 | .20-.30 | 1.20 | 24.00 | 1.55 | 31.00 |
| NE 9920 | .18-.23 | .50-.70 | .20-.35 | .40-.60 | 1.00-1.30 | .20-.30 | 1.20 | 24.00 | 1.55 | 31.00 |

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

## Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

| | Foundry | Basic | Bessemer | Malleable |
|---|---|---|---|---|
| **Bethlehem, Pa., base** | $26.00 | $25.50 | $27.00 | $26.50 |
| Newark, N. J., del. | 27.53 | 27.03 | 28.53 | 28.03 |
| Brooklyn, N. Y., del. | 28.50 | ..... | ..... | 29.00 |
| **Birdsboro, Pa.,** base | 26.00 | 25.50 | 27.00 | 26.50 |
| **Birmingham,** base | ‡21.38 | ‡20.00 | 26.00 | ..... |
| Baltimore, del. | 26.61 | ..... | ..... | ..... |
| Boston, del. | 26.12 | ..... | ..... | ..... |
| Chicago, del. | 25.22 | ..... | ..... | ..... |
| Cincinnati, del. | 25.06 | 23.68 | ..... | ..... |
| Cleveland, del. | 25.12 | 24.24 | ..... | ..... |
| Newark, N. J., del. | 27.15 | ..... | ..... | ..... |
| Philadelphia, del. | 26.46 | 25.96 | ..... | ..... |
| St. Louis, del. | 25.12 | 24.24 | ..... | ..... |
| **Buffalo, base** | 25.00 | 24.00 | 26.00 | 25.50 |
| Boston, del. | 26.50 | 26.00 | 27.50 | 27.00 |
| Rochester, del. | 26.53 | ..... | 27.53 | 27.03 |
| Syracuse, del. | 27.08 | ..... | 28.08 | 27.58 |
| **Chicago,** base | 25.00 | 24.50 | 25.50 | 25.00 |
| Milwaukee, del. | 26.10 | 25.60 | 26.60 | 26.10 |
| Muskegon, Mich., del. | 28.19 | ..... | ..... | 28.19 |
| **Cleveland,** base | 25.00 | 24.50 | 25.50 | 25.00 |
| Akron, Canton, O., del. | 26.39 | 25.89 | 26.89 | 26.39 |
| **Detroit,** base | 25.00 | 24.50 | 25.50 | 25.00 |
| Saginaw, Mich., del. | 27.31 | 26.81 | 27.81 | 27.31 |
| **Duluth,** base | 25.50 | 25.00 | 26.00 | 25.50 |
| St. Paul, del. | 27.63 | 27.13 | 28.13 | 27.63 |
| **Erie, Pa.,** base | 25.00 | 24.50 | 26.00 | 25.50 |
| **Everett, Mass.,** base | 26.00 | 25.50 | 27.00 | 26.50 |
| Boston, del. | 26.50 | 26.00 | 27.50 | 27.00 |
| **Granite City, Ill.,** base | 25.00 | 24.50 | 25.50 | 25.00 |
| St. Louis, del. | 25.50 | 25.00 | ..... | 25.50 |
| **Hamilton, O.,** base | 25.00 | 24.50 | ..... | 25.00 |
| Cincinnati, del. | 25.44 | 25.61 | ..... | 26.11 |
| **Neville Island, Pa.,** base | 25.00 | 24.50 | 25.50 | 25.00 |
| §Pittsburgh, del. No. & So. sides | 25.69 | 25.19 | 26.19 | 25.69 |
| **Provo, Utah,** base | 23.00 | 22.50 | ..... | ..... |
| **Sharpsville, Pa.,** base | 25.00 | 24.50 | 25.50 | 25.00 |
| **Sparrows Point,** base | 26.00 | 25.50 | ..... | ..... |
| Baltimore, del. | 26.99 | ..... | ..... | ..... |
| **Steelton, Pa.,** base | ..... | 25.50 | ..... | 26.50 |
| **Swedeland, Pa.,** base | 26.00 | 25.50 | 27.00 | 26.50 |
| Philadelphia, del. | 26.84 | 26.34 | ..... | 27.34 |
| **Toledo, O.,** base | 25.00 | 24.50 | 25.50 | 25.00 |
| **Youngstown, O.,** base | 25.00 | 24.50 | 25.50 | 25.00 |
| Mansfield, O., del. | 26.94 | 26.44 | 27.44 | 26.94 |

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. ‡For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

**High Silicon, Silvery**

6.00-6.50 per cent (base).....$30.50

| | | | |
|---|---|---|---|
| 6.51-7.00 | $31.50 | 9.01- 9.50 | 36.50 |
| 7.01-7.50 | 32.50 | 9.51-10.00 | 37.50 |
| 7.51-8.00 | 33.50 | 10.01-10.50 | 38.50 |
| 8.01-8.50 | 34.50 | 10.51-11.00 | 39.50 |
| 8.51-9.00 | 35.50 | 11.01-11.50 | 40.50 |

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

**Electric Furnace Ferrosilicon:** Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.00% Carbon, add $1.

**Bessemer Ferrosilicon**

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

**Charcoal Pig Iron**

Northern

Lake Superior Furn. .....$34.00
Chicago, del. ..... 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

**Gray Forge**

Neville Island, Pa. .....$24.50
Valley base ..... 24.50

**Low Phosphorus**

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

**Switching Charges:** Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

**Silicon Differential:** Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

**Phosphorus Differential:** Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

**Ceiling Prices** are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

**Exceptions to Ceiling Prices:** Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

## Refractories

Per 1000 f.o.b. Works, Net Prices

**Fire Clay Brick**

Super Duty

Pa., Mo., Ky. .....$68.50

First Quality

| | |
|---|---|
| Pa., Ill., Md., Mo., Ky. | 54.40 |
| Alabama, Georgia | 54.40 |
| New Jersey | 59.35 |
| Ohio | 47.70 |

Second Quality

| | |
|---|---|
| Pa., Ill., Md., Mo., Ky. | 49.35 |
| Alabama, eorgia | 40.30 |
| New Jersey | 52.00 |
| Ohio | 38.15 |

**Malleable Bung Brick**

All bases ..... 63.45

**Silica Brick**

| | |
|---|---|
| Pennsylvania | 54.40 |
| Joliet, E. Chicago | 62.45 |
| Birmingham, Ala. | 54.40 |

**Ladle Brick**
**(Pa., O., W. Va., Mo.)**

| | |
|---|---|
| Dry press | 32.90 |
| Wire cut | 30.80 |

**Magnesite**

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk ..... 22.00
net ton, bags ..... 26.00

**Basic Brick**

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

| | |
|---|---|
| Chrome brick | $54.00 |
| Chem. bonded chrome | 54.00 |
| Magnesite brick | 76.00 |
| Chem. bonded magnesite | 65.00 |

## Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF₂ content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.) war chemicals.

## Ferroalloy Prices

**Ferromanganese (standard)** 78-82% c.l. gross ton, duty paid, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton, f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn., where Tennessee Products Co. is seller; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is seller; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

**Ferromanganese (Low and Medium Carbon);** per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

**Spiegeleisen:** 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

**Electrolytic Manganese:** 99.9% plus, less ton lots, per lb. 37.6 cents.

**Chromium Metal:** 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

**Ferrocolumbium:** 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

**Ferrochrome:** High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

**Special Foundry ferrochrome:** (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

**S.M. Ferrochrome, high carbon:** (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

**S.M. Ferrochrome, low carbon:** (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

**SMZ Alloy:** (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

**Silcaz Alloy:** (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

**Silvaz Alloy:** (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

**CMSZ Alloy 4:** (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c. 14.75c, 15.25c, western; spot up .25c.

**CMSZ Alloy 5:** (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

**Ferro-Boron:** (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

**Manganese-Boron:** (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.023 central, $1.935 and $2.055 western, spot up 5c.

**Nickel-Boron:** (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

**Chromium-Copper:** (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.

**Vanadium Oxide:** (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

**Calcium metal; cast:** Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western, spot up 5c.

**Calcium-Manganese-Silicon:** (Cal. 16-20% mang. 14-18% and sil. 55-60%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

**Calcium-Silicon:** (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, cariot, lump 15.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 25c.

**Briquets, Ferromanganese:** (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .0665c, .0685c, .0855c and .088c, western; spot up .25c.

**Briquets: Ferrochrome,** containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

**Ferromolybdenum:** 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

**Ferrophosphorus:** 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

**Ferrosilicon:** Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

**Silicon Metal:** Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

**Manganese Metal:** (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

**Ferrotungsten:** Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

**Tungsten Metal Powder:** spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

**Ferrotitanium:** 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

**Ferrotitanium:** 20-25%, 0.10 maximum carbon, per lb. contained titanium: ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

**High-Carbon Ferrotitanium:** 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

**Carbortam:** Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

**Bortam:** Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

**Ferrovanadium:** 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

**Zirconium Alloys:** 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

**Zirconium Alloy:** 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

**Alsifer:** (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

**Simanal:** (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

**Borosil:** 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

# OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 150 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

**PHILADELPHIA:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $18.75 |
| No. 2 Heavy Melt. Steel | 18.75 |
| No. 2 Bundles | 18.75 |
| No. 3 Bundles | 14.75-15.25 |
| Mixed Borings, Turnings | 12.50-13.00 |
| Machine Shop Turnings | 12.50-13.00 |
| Billet, Forge Crops | 23.75 |
| Bar Crops, Plate Scrap | 21.25 |
| Cast Steel | 21.25 |
| Punchings | 21.25 |
| Elec. Furnace Bundles | 19.75 |
| Heavy Turnings | 18.25 |

**Cast Grades**

(F.o.b. Shipping Point)

| | |
|---|---|
| Heavy Breakable Cast | 16.50 |
| Charging Box Cast | 19.00 |
| Cupola Cast | 20.00 |
| Unstripped Motor Blocks | 17.50 |
| Malleable | 22.00 |
| Chemical Borings | 16.51 |

**NEW YORK:**

(Dealers' buying prices.)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $15.33 |
| No. 2 Heavy Melt. Steel | 15.33 |
| No. 2 Hyd. Bundles | 15.33 |
| No. 3 Hyd. Bundles | 13.33 |
| Chemical Borings | 14.33 |
| Machine Turnings | 8.00 |
| Mixed Borings, Turnings | 8.00 |
| No. 1 Cupola | 20.00 |
| Charging Box | 19.00 |
| Heavy Breakable | 16.50 |
| Unstrip Motor Blocks | 17.50 |
| Stove Plate | 19.00 |

**CLEVELAND:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $19.50 |
| No. 2 Heavy Melt. Steel | 19.50 |
| No. 1 Comp. Bundles | 19.50 |
| No. 2 Comp. Bundles | 19.50 |
| No. 1 Busheling | 19.50 |
| Mach. Shop Turnings | 11.00-11.50 |
| Short Shovel Turnings | 14.50-15.00 |
| Mixed Borings, Turnings | 12.50-13.00 |
| No. 1 Cupola Cast | 20.00 |
| Heavy Breakable Cast | 16.50 |
| Cast Iron Borings | 13.50-14.00 |
| Billet, Bloom Crops | 24.50 |
| Sheet Bar Crops | 22.00 |
| Plate Scrap, Punchings | 22.00 |
| Elec. Furnace Bundles | 20.50 |

**BOSTON:**

(F.o.b. shipping points)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $14.06 |
| No. 2 Heavy Melt. Steel | 14.06 |
| No. 1 Bundles | 14.06 |
| No. 2 Bundles | 14.06 |
| No. 1 Busheling | 14.06 |
| Machine Shop Turnings | 6.00-6.50 |
| Mied Borings, Turnings | 6.00-6.50 |
| Short Shovel Turnings | 8.75-9.75 |
| Chemical Borings | 13.81 |
| Low Phos. Clippings | 16.56 |
| No. 1 Cast | 20.06 |
| Clean Auto Cast | 20.00 |
| Stove Plate | 19.00 |
| Heavy Breakable Cast | 16.50 |

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

**PITTSBURGH:**

(Delivered consumer's plant)

| | |
|---|---|
| Railroad Heavy Melting | $21.00 |
| No. 1 Heavy Melt. Steel | 20.00 |
| No. 2 Heavy Melt. Steel | 20.00 |
| No. 1 Comp. Bundles | 20.00 |
| No. 2 Comp. Bundles | 20.00 |
| Short Shovel, Turnings | 16.00-16.50 |
| Mach. Shop Turnings | 14.00 |
| Mixed Borings, Turnings | 14.00 |
| No. 1 Cupola Cast | 20.00 |
| Heavy Breakable Cast | 16.50 |
| Cast Iron Borings | 16.00 |
| Billet, Bloom Crops | 25.00 |
| Sheet Bar Crops | 22.50 |
| Plate Scrap, Punchings | 22.50 |
| Railroad Specialties | 24.50 |
| Scrap Rail | 21.50 |
| Axles | 26.00 |
| Rail 3 ft. and under | 23.50 |
| Railroad Malleable | 21.00 |

**VALLEY:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 R.R. Hvy. Melt. | $21.00 |
| No. 1 Heavy Melt Steel | 20.00 |
| No. 1 Comp. Bundles | 20.00 |
| Short Shovel Turnings | 15.00-15.50 |
| Cast Iron Borings | 14.00-14.50 |
| Machine Shop Turnings | 12.00-12.50 |
| Low Phos. Plate | 21.00-22.00 |

**MANSFIELD, O.:**

(Delivered consumer's plant)

| | |
|---|---|
| Machine Shop Turnings | 10.50-11.00 |

**BIRMINGHAM:**

(Delivered consumer's plant)

| | |
|---|---|
| Billet, Forge Crops | $22.00 |
| Structural, Plate Scrap | 19.00 |
| Scrap Rails, Random | 18.50 |
| Rerolling Rails | 20.50 |
| Angle Splice Bars | 20.50 |
| Solid Steel Axles | 24.00 |
| Cupola Cast | 20.00 |
| Stove Plate | 19.00 |
| Long Turnings | 8.50- 9.00 |
| Cast Iron Borings | 8.50- 9.00 |
| Iron Car Wheels | 16.50-17.00 |

**CHICAGO:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 R.R. Hvy. Melt | $19.75 |
| No. 1 Heavy Melt. Steel | 18.75 |
| No. 2 Heavy Melt. Steel | 18.75 |
| No. 1 Ind. Bundles | 18.75 |
| No. 2 Dlr. Bundles | 18.75 |
| Baled Mach. Shop Turn. | 18.75 |
| No. 3 Galv. Bundles | 16.75 |
| Machine Turnings | 12.50-13.00 |
| Mix. Borings, Sht. Turn. | 13.25-13.75 |
| Short Shovel Turnings | 14.00-14.50 |
| Cast Iron Borings | 13.25-13.75 |
| Scrap Rails | 20.25 |
| Cut Rails, 3 feet | 22.25 |
| Cut Rails, 18-inch | 23.50 |
| Angles, Splice Bars | 22.25 |
| Plate Scrap, Punchings | 21.25 |
| Railroad Specialties | 22.75 |
| No. 1 Cast | 20.00 |
| R.R. Malleable | 22.00 |

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

**BUFFALO:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $19.25 |
| No. 2 Heavy Melt. Steel | 19.25 |
| No. 1 Bundles | 19.25 |
| No. 2 Bundles | 19.25 |
| No. 1 Busheling | 19.25 |
| Machine Turnings | 12.00 |
| Short Shovel Turnings | 15.00 |
| Mixed Borings, Turn. | 12.00 |
| Cast Iron Borings | 14.00 |
| Low Phos. | 21.75 |

**DETROIT:**

(Dealers' buying prices)

| | |
|---|---|
| Heavy Melting Steel | $17.32 |
| No. 1 Busheling | 17.32 |
| Hydraulic Bundles | 17.32 |
| Flashings | 17.32 |
| Machine Turnings | 7.00- 7.50 |
| Short Shovel Turnings | 10.50-11.00 |
| Cast Iron Borings | 9.50-10.00 |
| Low Phos Plate | 19.32-19.82 |
| No. 1 Cast | 20.00 |
| Heavy Breakable Cast | 13.50-14.00 |

**ST. LOUIS:**

(Delivered consumer's plant)

| | |
|---|---|
| Heavy Melting | $17.50 |
| No. 1 Locomotive Tires | 20.00 |
| Misc. Rails | 19.00 |
| Railroad Springs | 22.00 |
| Bundled Sheets | 17.50 |
| Axle Turnings | 17.00 |
| Machine Turnings | 9.00-9.50 |
| Rerolling Rails | 21.00 |
| Steel Car Axles | 21.50-22.00 |
| Steel Rails, 3 ft. | 21.50 |
| Steel Angle Bars | 21.00 |
| Cast Iron Wheels | 20.00 |
| No. 1 Machinery Cast | 20.00 |
| Railroad Malleable | 22.00 |
| Breakable Cast | 16.50 |
| Stove Plate | 19.00 |
| Grate Bars | 15.25 |
| Brake Shoes | 15.25 |

(Cast grades f.o.b. shipping point)

| | |
|---|---|
| Stove Plate | 18.00 |

**CINCINNATI:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $18.50 |
| No. 2 Heavy Melt. Steel | 18.50 |
| No. 1 Comp. Bundles | 18.50 |
| No. 2 Comp. Bundles | 18.50 |
| Machine Turnings | 7.50- 8.00 |
| Shoveling Turnings | 9.50-10.00 |
| Cast Iron Borings | 9.50-10.00 |
| Mixed Borings, Turnings | 8.50- 9.00 |
| No. 1 Cupola Cast | 20.00 |
| Breakable Cast | 16.50 |
| Low Phosphorus | 21.00-21.50 |
| Scrap Rails | 20.50-21.00 |
| Stove Plate | 16.00-16.50 |

**LOS ANGELES:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $14.00 |
| No. 2 Heavy Melt. Steel | 13.00 |
| No. 1, 2 Deal. Bundles | 12.00 |
| Machine Turnings | 4.50 |
| Mixed Borings, Turnings | 4.00 |
| No. 1 Cast | 20.00 |

**SAN FRANCISCO:**

(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $15.50 |
| No. 2 Heavy Melt. Steel | 14.50 |
| No. 1 Busheling | 15.50 |
| No. 1, No. 2 Bundles | 13.50 |
| No. 3 Bundles | 9.00 |
| Machine Turnings | 6.00 |
| Billet, Forge Crops | 15.50 |
| Bar Crops, Plate | 15.50 |
| Cast Steel | 15.50 |
| Cut Structural, Plate, 1", under | 18.00 |
| Alloy-free Turnings | 7.50 |
| Tin Can Bundles | 14.50 |
| No. 2 Steel Wheels | 16.00 |
| Iron, Steel Axles | 23.00 |
| No. 2 Cast Steel | 15.00 |
| Uncut Frogs, Switches | 16.00 |
| Scrap Rails | 16.00 |
| Locomotive Tires | 16.00 |

# LOGEMANN Presses for Sheet Scrap

## THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, **LOGEMANN SCRAP PRESSES** are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill Service,* presses *designed for automobile plant conditions,* presses *designed for general plant applications.* Write for details.

**LOGEMANN BROTHERS COMPANY**
**3126 W. Burleigh St.** **Milwaukee, Wisconsin**

**The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.**

# NONFERROUS METAL PRICES

**Copper:** Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

**Brass Ingot:** Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

**Zinc:** Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

**Lead:** Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

**Primary Aluminum:** 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

**Secondary Aluminum:** All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

**Magnesium:** Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

**Tin:** Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1¼c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

**Antimony:** American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

**Nickel:** Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

**Mercury:** OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities.

**Arsenic:** Prime, white, 99%, carlots, 4.00c lb.

**Beryllium-Copper:** 3.75-4.25% Be., $17 lb. contained Be.

**Cadmium:** Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

**Cobalt:** 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

**Indium:** 99.9%, $7.50 per troy ounce.

**Gold:** U. S. Treasury, $35 per ounce.

**Silver:** Open market, N. Y. 44.75c per ounce.

**Platinum:** $35 per ounce.

**Iridium:** $165 per troy ounce.

**Palladium:** $24 per troy ounce.

## Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

**Sheet:** Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

**Rods:** Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

**Seamless Tubing:** Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

**Extruded Shapes:** Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

**Angles and Channels:** Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

**Copper Wire:** Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

**Aluminum Sheets and Circles:** 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

| Gage | Width | Sheets | Circles |
|---|---|---|---|
| .249"-7 | 12"-48" | 22.70c | 25.20c |
| 8-10 | 12"-48" | 23.20c | 25.70c |
| 11-12 | 26"-48" | 24.20c | 27.00c |
| 13-14 | 26"-48" | 25.20c | 28.50c |
| 15-16 | 26"-48" | 26.40c | 30.40c |
| 17-18 | 26"-48" | 27.90c | 32.90c |
| 19-20 | 24"-42" | 29.80c | 35.30c |
| 21-22 | 24"-42" | 31.70c | 37.20c |
| 23-24 | 3"-24" | 25.60c | 29.20c |

**Lead Products:** Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

**Zinc Products:** Sheet f.o.b. mill. 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

## Plating Materials

**Chromic Acid:** 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

**Copper Anodes:** Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

**Copper Carbonate:** 52-54% metallic cu, 250 lb. barrels 20.50c.

**Copper Cyanide:** 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

**Sodium Cyanide:** 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

**Nickel Anodes:** 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

**Nickel Chloride:** 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

**Tin Anodes:** 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

**Tin Crystals:** 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

**Sodium Stannate:** 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

**Zinc Cyanide:** 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

**Brass Mill Allowances:** Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

## Scrap Metals

| | Clean Heavy | Rod Ends | Clean Turnings |
|---|---|---|---|
| Copper | 10.250 | 10.250 | 9.500 |
| Tinned Copper | 9.625 | 9.625 | 9.375 |
| Yellow Brass | 8.625 | 8.375 | 7.875 |
| Conamercial bronze | | | |
| 90% | 9.375 | 9.125 | 8.625 |
| 95% | 9.500 | 9.250 | 8.750 |
| Red Brass, 85% | 9.125 | 8.875 | 8.375 |
| Red Brass, 80% | 9.125 | 8.875 | 8.375 |
| Muntz metal | 8.000 | 7.750 | 7.250 |
| Nickel Sil, 5% | 9.250 | 9.000 | 4.625 |
| Phos. br., A, B, 5% | 11.000 | 10.750 | 9.750 |
| Herculoy, Everdur or equivalent | 10.250 | 10.000 | 9.250 |
| Naval brass | 8.250 | 8.000 | 7.500 |
| Mang. bronze | 8.250 | 3.000 | 7.500 |

**Other than Brass Mill Scrap:** Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

**Aluminum Scrap:** Prices f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high-grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

**Lead Scrap:** Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

**Zinc Scrap:** New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

**Nickel, Monel Scrap:** Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

**Nickel:** 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

**Cupro-nickel:** 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

**Monel:** No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

## Sheets, Strip . . .

Sheet & Strip Prices, Page 180

Sheet backlogs continue heaviest of all major steel products and possibility of deliveries of unrated tonnage in third quarter are no brighter. Manufacturers of civilian goods who have expected supplies of sheets and strip for their products find little possibility of obtaining shipments in this quarter, unless priorities assistance is forthcoming.

**Boston** — Heavier orders for narrow cold strip against allotments dashed hopes for delivery of any substantial unrated volume this quarter. Orders placed on an unrated basis in some instances have been given allotments or priorities assistance for fabrication of components for essential civilian goods for which quotas have been assigned, an instance being producers of stampings. Typewriter builders have both rated and unvalidated orders in with mills. A flurry in rated orders is ascribed to late allotments by WPB and delays in applications for them on part of some fabricators who had hoped to fill requirements on an unrated basis. This has extended backlogs of priority tonnage with some producers well into fourth quarter. Cancellations continue irregular. No definite promises are made as to unrated shipments in third quarter. Only late cancellations involving tonnage already processed are likely to make available free spot material, providing specifications are suitable.

Hot strip deliveries have improved materially with some mills, reflecting cancellations of forward orders on the part of converters, recently placed on a revised replacement schedule as to hot metal requirements. This also has resulted in revisions in July hot mill schedules.

**Chicago** — Sheetmakers are hopeful that WLB's request for reports on orders for third quarter will bring a clearing of considerable tonnage. There is a feeling that some consumers have placed unrated orders with several mills in hope of getting deliveries from at least one. Under present conditions, there is scant hope for unrated business to be accommodated this year. Sheets needed urgently for early delivery require a directive and some mills receiving such directives have uncomfortable overloads. Strip mill sizes are not available before March, hot-rolled and hot-rolled pickled in February. Cold-rolled finds openings in December. Galvanized is in March. Narrow and wide strip and hot-rolled strip stands in December, while hot-rolled pickled is not obtainable before February.

**Cleveland** — There seems little likelihood that any considerable tonnage of unrated orders for sheets and strip will be rolled this quarter. However, in a few instances abrupt opening in rolling schedules, resulting from contract cancellations, has enabled some producers to ship tonnage for civilian goods account. However, these opportunities are relatively few and tonnage involved is small. Active demand continues for steel on the shell container and steel drum programs, with little change noted in other key war requirements. Sheet sellers are booked through the remainder of this year on most items, with galvanized extended into March. Further increase in unrated orders has been noted lately.

**Pittsburgh** — Sheet mill rolling schedules have been little affected by war contract cutbacks. In many instances contractors have left the tonnage involved in a contract adjustment on mill rolling schedules on the chance of booking other war contracts or that shipment of the steel would be made for civilian goods account. Leading interest here reports near record carryover tonnage in third quarter of about a month's output on galvanized sheets, cold-rolled items and among the lighter gages of hot-rolled sheets. The proportion of unrated orders to CMP authorized tonnage has increased substantially in recent weeks. Sellers report many contractors are placing duplicate unrated orders with a number of producers on the hope that the tonnage could be meshed into rolling schedules when order cancellations occur. However, little sheet or strip tonnage is expected to be shipped for civilian goods during the third quarter.

The overall steel supply situation for third quarter is expected to leave little or no steel for civilian goods account, trade reports indicate. However, this is on the basis of current military requirements, and therefore does not take into consideration the expected sharp increase in war contract cancellations and cutbacks anticipated during the period. Third quarter war steel requirements are expected to be about 15 million net tons on basis of current schedules, com-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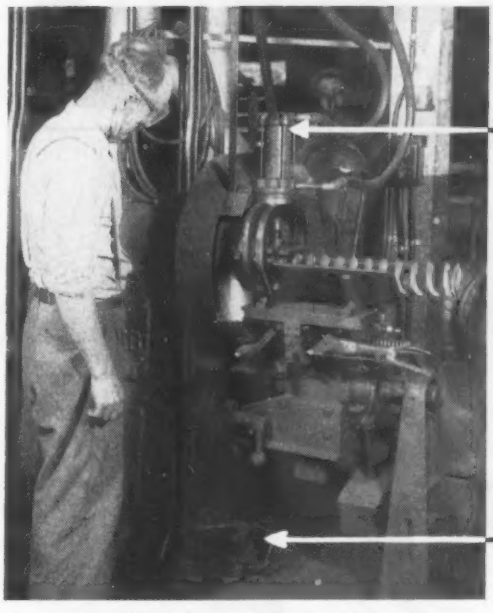

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pared with 16.1 million in the initial three months this year on a two-front war basis. After an allowance of 300,000 tons for mechanical breakdowns, strikes, etc., there is an apparent balance of 800,000 tons for civilian use. However, steel carryover tonnage into third quarter is estimated at 1.9 million. About 500,000 tons of this 1.9 million represents tonnage involved in contract cancellations but which has not yet been reported back to mills.

**New York**—Although deliveries are not quite so extended, the situation in sheets remains tight. Mills had a carryover into the current quarter of about 600,000 tons and most producers believe they will be unable to catch up before last quarter, if then. This means that unrated tonnage will be practically out of the question for the current quarter, although there may be a little tonnage in the heavier gages.

Prospects for civilian automobile tonnage in third quarter are poor. Some believe that the automobile builders' best hope lies in the operation of Direction 70, Reg. 1, which permits diversion of military allotments on civilian type products, where cutbacks have occurred. Help may also be gained through application of excess stocks and this should be especially true with regard to stainless steel, on which all mill orders are rated. It appears that there is a fairly good supply of excess stainless steel at various plants throughout the country. However, this tonnage may prove rather costly as it will be found to be in various shapes, which means a substantial scrap loss; also some will be in grades more difficult to process than those usually specified.

Reflecting recent shell cancellations is a substantial cutback in the order of one large container manufacturer here for long terne shell containers

**Cincinnati**—Sheet mills in this district went into third quarter with carryover tonnage on rated orders which shows no relaxing in the tight situation on nearby deliveries. Readjustments and cutbacks may release sheets during the quarter for household appliances and other domestic needs, but these developments so far have not been in volume to assure the material. The volume of unvalidated, hence unscheduled, orders is constantly expanding.

**St. Louis**—Pressure on sheets continues heaviest in two years but a paradoxical labor situation threatens to reduce production by 20 per cent in the next few weeks. In spite of heavy labor layoffs and shutdowns in four major consuming plants, labor shortage is becoming more critical. Rated sheet orders now scheduled for January may be extended soon. As a result of the layoffs, War Manpower Commission advisors here recommend suspension of manpower controls.

## Steel Bars . . .

Bar Prices, Page 180

Bar deliveries on smaller diameters are becoming easier and it is possible some "free" tonnage in small sizes may be available in third quarter. The situation is mixed, some producers being booked solidly through third quarter and into fourth. At the same time it is possible to place orders for comparatively prompt delivery, notably in alloys, which are fairly easy, some electric furnace alloy producers being able to promise July delivery.

**Philadelphia**—Small size hot carbon bars can be had in third quarter and there may even be some "free" tonnage in small specifications before the quarter is over, but little will be available in the sizes involved in recent shell cancellations. Cold-drawn carbon bar schedules may reflect shell cutbacks in third quarand possibly to a limited extent before the present month is over. However, cold drawers doubt if their operations will be affected much before the last of the year. At present they are booked fairly solidly into November and have nothing to offer before December and January on larger sizes, from about 2¼ inches up. Much of this larger size tonnage is going into rockets, although some is for striker components for fire bombs and other munitions.

Cold-drawn alloy bars can be had in August and September, the situation being generally easier as a result of curtailments in aircraft and combat tank programs, which also affect hot-rolled alloys. Some producers of hot-rolled electric furnace alloys still can promise deliveries for July.

**Chicago**—Considerable confusion exists over the bar situation. Some producers are heavily booked through third quarter and into fourth; but reports are current that it is not difficult to place orders with some makers here and elsewhere for fairly prompt scheduling. This is

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true for alloy grades, which are available for August delivery. Quality and regular carbon grades range from September through December. It is agreed, however, that the shell billet situation has eased considerable, due in part to recent cutbacks in heavy ammunition schedules for the remainder of the year. With the closing of the Geneva structural mill, it is reported that a substantial tonnage of shell billets on order for Kaiser has been transferred to a Chicago mill.

**St. Louis**—Pressure for steel bar delivery is easing under cutbacks in ammunition and bomb production schedules. Labor shortage hampers production. Increasing number of civilian orders for all purposes is adding to potential back logs.

**New York**—Despite cutbacks in shell work bar sellers continue to quote late in the year and beyond on all but smaller sizes. On hot-top quality steel some producers are quoting well into second quarter next year. Deliveries on alloy bars, on the other hand, are easy, falling generally in August.

## Steel Plates . . .

Plate Prices, Page 181

Plates continue the easiest major steel product, with some capacity for unrated orders expected to be available in third quarter. Buying is light. The situation is unbalanced, a midwestern mill receiving some directives recently in spite of the fact some other mills are actively seeking tonnage. At least one producer can take wide and narrow sheared plates for September and universal for October.

**Chicago**—Plate situation varies according to mill, some makers finding schedules declining and others holding at a substantial level. One local platemaker in the latter category continues to receive an occasional directive despite the fact that mills in other areas are actively seeking new business. Result is that the local mill is in no position to take on unrated business. Another mill, less heavily booked can take both wide and narrow sheared plates in September, and universal in October.

**Boston**—Plates are available against unrated orders for August with some mills, notably for universal, but open ending of CMP has resulted in small material increase in buying. For Navy ships moderate tonnage is required, but below peak. Some plates are required for ship reconversion but demand from other directions is light. Easing in plates increasingly improves semi-finished supply at some mills.

**Philadelphia**—Plate demand is uneven, with sellers of sheared plates booked six to eight weeks ahead. Capacity for unrated tonnage will be available before third quarter is ended but to date relatively little has been booked.

**New York**—Plate demand is fairly active, with an increasing volume of unrated tonnage and with some scattered orders placed for Sweden, Portugal and the French colonies. Specifications are heavy for ship reconversion and repair.

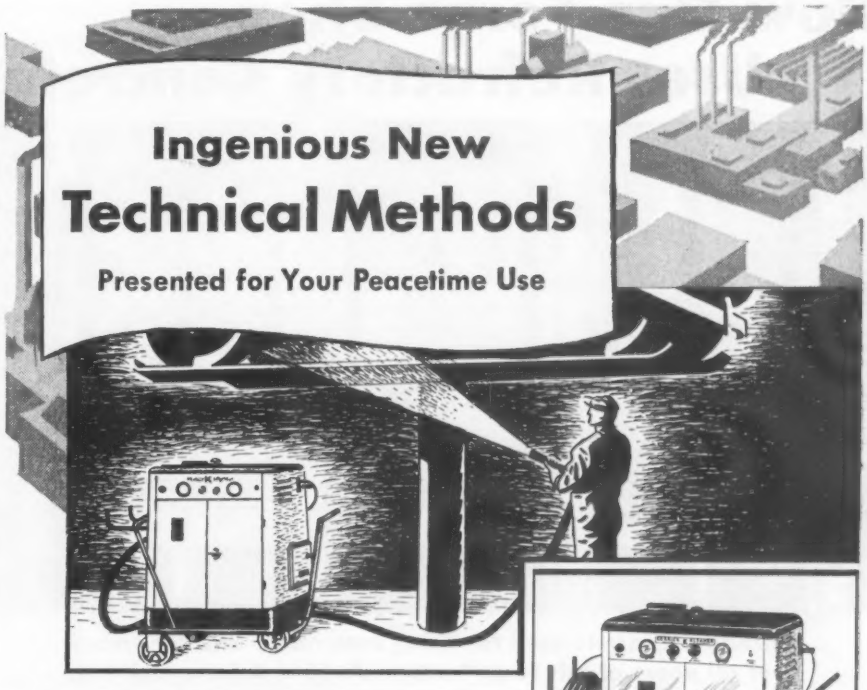
**Pittsburgh** — Manpower is the major choke point in effort to increase production of sheets on plate mills that have completed plate schedules for shipbuilding and other key war programs. However, progress is being made and it is hoped that the tight delivery situation in sheets can be eased somewhat this quarter through greater output on converted plate mills. Plate producers expect to have considerable capacity for unrated orders for universal plates this quarter. The delivery situation on sheared plates is somewhat more extended, but here also shipment on unrated orders will undoubtedly be made during August or earlier. Volume of unrated plate orders has been relatively small to date, for most heavy industries are still working off government contracts and there is little pressure to get on mill rolling schedules because of the excess capacity.

## Wire . . .

Wire Prices, Page 181

**Chicago**—Dealers and jobbers indicate that virtually all merchant wire products are being sought actively. This is surprising in view of the tight restrictions which WPB is enforcing on lumber sales, thus holding down nail consumption, and the fact that heavy rainfall probably will impair crop yield this year. Demand for small sizes of nails and steel fence posts exceeds that for other merchant items. For manufacturers' wire, the trade anticipates that substantial orders for mesh, electrical wires and cables will be offered soon. Consumers are keeping close watch over inventories.

**Boston** — Pressure is increasing for priorities assistance on delivery of wire orders placed by the automotive industry, now with mills on an unrated basis with dim chances for third quarter de-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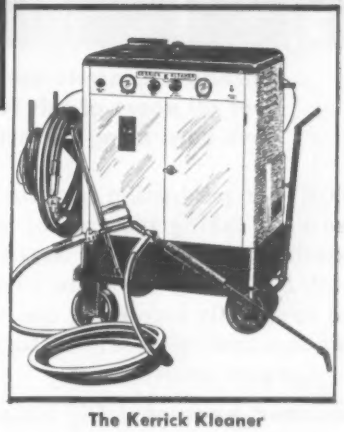

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livery in volume. Unless firm allotments are forthcoming or cancellations develop in much greater volume than has been the case until now, prospects of delivery of much "free" or open unvalidated volume this quarter are small. Some aircraft volume, including valve spring wire, has been reinstated. Bookings on rated orders are lower and in some instances shipments about balance incoming volume of this type. Aggregate tonnage involved in unrated tonnage offered is heavy, but definite delivery promises are few. Here and there government cancellations have opened some fine wire capacity which is promptly filled by moving rated orders ahead. Nevertheless, several mills are looking for orders for wire 0.021 and finer. Spring and basic wire schedules are filled with CMP orders. A somewhat tighter situation in rods with some mills is complicated by 40,000 tons wanted for France.

**Buffalo** — Although still working on substantial top priority contracts, a leading wire producer reports a good chance that it will be able to start filling some non-rated low carbon wire business by the end of July. Hopes were based on a falling off in demand as a result of cutbacks in wire for fragmentation bombs.

## Tubular Goods . . .

Tubular Goods Prices, Page 181

**Seattle**—Inquiry for cast iron pipe is active but delivery is unsatisfactory, 60 days being about the earliest promised. In some instances other types of pipe have been substituted. Seattle has ordered 275 tons of 8 and 16-inch for local improvements from H. C. Purcell for U. S. Pipe & Foundry Co. Pacific States Cast Iron Pipe Co. has booked about 200 tons for Vancouver, Wash. Carlton, Oreg., will open bids July 9 for 14,500 feet of 4, 6 and 10-inch pipe and fittings. R. H. Corey, Portland, Oreg., is engineer. Plentywood, Mont., has approved a $48,000 bond issue for a proposed water system. Grandview, Wash., has sold a $20,000 bond issue and will ask bids soon for 8-inch cast iron pipe. E. F. Pugsley, Seattle, is low to Kelso, Wash., for furnishing pipe, at $40,000 for cast iron pipe and $36,000 for concrete.

## Tin Plate . . .

Tin Plate Prices, Page 181

**Chicago**—Despite the fact that November is the first month with openings for tin plate, order volume is substantial and most is unrated. It is a question whether the unvalidated business will find its way into schedules this year. Tin plate makers also report that lend-lease commitments for export against third and fourth quarter directives also aggregate heavier than in several months. Shipments from mills are at a good pace, but trouble may lie ahead as the expanding grain movement from western states increase the strain on box car supply.

**Pittsburgh** — Included in the expansion program of Carnegie-Illinois Steel Corp., recently announced, to increase cold-reduced strip facilities considerably, are several new pots to be installed on the hot-dip lines of the Irvin works. This is an interesting and significant development inasmuch as many observers have written off much hot-dip tin plate equipment as excess capacity. It now appears that postwar demand for dipped plate will be more than currently existing capacity can produce. According to informed sources here, this may also be true of electrolytic lines but as yet there is no evidence to substantiate this point.

## Structural Shapes . . .

Structural Shape Prices, Page 181

**New York** —While few structural awards are being noted, inquiry is increasing and is placing a heavy strain on drafting departments of fabricators. In fact, with their forces having been so badly depleted by demands of some of the more urgent war activities, such as shipbuilding, some leading fabricators today are being forced to pass up some of the projects now coming out for figures. Of course, the emergency in some of these lines, such as shipbuilding, is abating; however, not sufficiently yet to make any important difference. Fabricators believe it will be at least another three or four months perhaps before an appreciable easing appears in the supply of draftsmen; and some believe it will be longer than that.

Included in the few awards reported at this time is a plant addition for the New Departure Division of General Motors Corp., Hartford, Conn., requiring 335 tons, placed through Topper & Griggs, New Haven, with Bethlehem Fabricators, Bethlehem, Pa.

One factor for delay in placing struc-


# How One Forge Shop Uses Refractory Concrete

**Refractory Concrete used for lining center door and for arches over all doors of this forge furnace. A. Finkl & Sons, Chicago, have been using Refractory Concrete for the past twelve years.**

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tural steel is continued tightening in shape mill deliveries, due in part to further shell work and lend-lease rehabilitation requirements. Mills are booked solidly into September, with one large producer quoting November shipments on standard sections. Prospects for unrated tonnage in third quarter are slim, a situation which is holding up considerable inquiry.

**Philadelphia** — Domestic structural orders are light, although considerable work is being figured and shape schedules are well extended. At least two large producers are out of the market for third quarter on standard sections, with one booked solidly into November. Contributing to this situation is said to be lend-lease business for construction abroad. United Engineers, Philadelphia, is asking bids on an unstated tonnage for a carbon black plant in Texas.

**Chicago** — The recent wave of new construction work has been slow in reaching the stage of award. This is believed to be due to the tightness of steel and also to an inability to gain government approval. In the meantime, new inquiry has been light. However, reports are heard that many new jobs will be out for bids in the next few weeks. September is the first open month on mill books for standard shapes.

**Pittsburgh** — New buying on the storage building and barracks program has brought in a fair tonnage during the past week. There is some miscellaneous construction work, but in the main new tonnage is small compared to backlogs now existing. Cancellations have come through on some contracts and producers here expect some structural tonnage will be available in third quarter for unrated orders despite the fact that most mills are now booked for complete capacity during that period.

## Reinforcing Bars . . .

Reinforcing Bar Prices, Page 181

**Chicago** — Inquiry for reinforcing steel, except small miscellaneous jobs, has dropped sharply in the last week or ten days. There also has been a decline in awards on which bids are already in. Suppliers report that some projects seem to evaporate after bids are taken, the assumption being that sponsors fail to get government approval.

## Pig Iron . . .

Pig Iron Prices, Page 183

General shutdown by foundries the first week in July interrupted pig iron melt somewhat but resumption this week will be at full capacity of labor supply. Additional stacks are being blown out for repairs as the hard driving of many past months taken toll of linings. Another stack has been blown out in the Chicago district and one in the Youngstown area. Backlog of war castings orders is estimated at five months.

**Philadelphia** — Curtailment in pig iron shipments the past week because of holiday influence came as a welcome breather for producers as most were behind on shipments, with substantial demand looming. Official Washington estimates place war order backlogs of gray iron foundries at five months. Outlook among basic consumers also is active. A leading Buffalo producer expects to get a large blast furnace back in production about the middle of August after being down for repairs since early in the year.

**Chicago** — The fact that many foundries were down last week to give workers a holiday, to check and repair equipment and to take inventory was a welcome relief to pig iron suppliers. With iron in tight supply, due partly to strong demand and partly to a deteriorating blast furnace situation in the district, any lessening of consumption tends to remove the strain. While foundries have had some orders cut back, other business of essential character is in hand to take its place. Inland Steel Co. blew out its Indiana Harbor No. 5 furnace June 23 for relining, leaving 37 of the district's 41 stacks active. Long and active campaigns are taking their toll of furnaces now. Interlake Iron Co. found it necessary to take wind off one of its two Federal furnaces four or five days for repairs.

**Boston** — Most consumers strive to maintain inventories close to 30 days and monthly shipments are relatively numerous, without material change in melt. For larger consumers inventory limitations tend to retard normal forward buying and in case of basic this margin, while safe for the season, is dangerously low for periods of uncertain transportation. Shortage of labor continues to hamper increase of melt in several industries on which production controls have been eased or removed.

**Youngstown** — Carnegie-Illinois Steel Corp is blowing out its No. 3 blast furnace at Farrell Works, one of two at the plant, for relining, expected to be


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down for nearly four months.

**New York**—Pig iron shipments are approaching normal, now that the holiday period is over. Various foundries, although not quite as many as originally expected, closed down during the first week in July for vacations and inventory taking. Unless the weather is excessively hot, the indication is that the melt over the next several weeeks will be at as high a rate as the supply of manpower will permit, for plenty of business appears to be in sight.

In connection with recent reports of tentative orders being booked by producers for shipment to Sweden, it is understood that the question of bringing iron ore from Sweden to this country in payment did not seriously enter the negotiations. The business was placed tentatively on the basis of price ruling at time of delivery, with payments to be financed on regular terms.

**Cincinnati**—The foundry melt during the holiday week was far below normal because of numerous vacation shutdowns. Demand for castings has not slackened and the backlog of orders is heavy. Buying of pig iron for third quarter, however, reflects little hope for a general expansion of operations in the face of limited manpower. Shipments recently have been more satisfactory, and the shutdowns also aided in building up stocks which were critically short in recent months.

**Buffalo** — Pig iron demand continues to hold at about recent peak levels. Railroad demands head the list of peacetime and reconversion orders. A growing volume of civilian work is reported edging its way into order books. An increased tonnage is said to be moving to New England consumers, both by canal and by rail.

## Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 181

**New York** — Bolt and nut manufacturers assert that there has been only a slight overall easing in their backlogs. Cutbacks have not been as heavy as expected and have been offset to a considerable degree by other work, largely for the Army and Navy. At present a large number of bolts, running into the millions, are being figured by fabricators for knock-down barracks. They fall in the range of small sizes, particularly ⅜-inch.

Deliveries on small bolts now average around 10 to 12 weeks, while those on the large range around 4 to 5 weeks, reflecting particularly the lag in heavy building construction.

Bolt and nut makers generally are not accepting unrated orders, as they are not sufficiently sure that they will be able to obtain unrated tonnage from mills to meet the schedules desired.

## Scrap . . .

Scrap Prices, Page 184

Steelmaking scrap and all other grades except light scrap, borings and turnings are strong at ceilings, and the latter are advancing close to the top as demand continues and supply shrinks. Cast grades are continuously scarce and some steelmaking scrap also is less than demand. Lack of yard labor to process steel scrap causes some tightness.

**Philadelphia**—Machine shop turnings and mixed borings and turnings have advanced again, reaching $12.50 to $13, delivered. Expectation is general that these grades will reach ceilings of $13.75 shortly. No. 3 bundles also are higher, at $14.75 to $15.25. All other grades are at ceilings, with demand in general in excess of supply. This is particularly true of cast grades and in less degree in better grades of melting steel. There is a reasonably good supply of steel scrap but not enough labor at yards to process it.

**Boston**—Strength in heavy melting steel is reflected in firmer prices for lighter steelmaking grades, unprepared and short shoveling turnings, among others. Bids for machine shop turnings are better than $1.25 above the recent low. Demand for all grades is more active, including chemical borings at ceiling, while recent spot offerings of cast scrap bring out numerous bids at ceiling.

**Cleveland**—More active demand for all scrap grades is noted here, and movement from this district into the Youngstown area has also increased recently. All softness in turnings prices has disappeared, with machine shop items moving at $11 to $11.50. Supply of this grade continues to tighten as effect of cutbacks begins to be reflected in current production schedules. Cast scrap is in particular short supply, with slight easing in

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foundry manpower situation permitting moderate increase in gray iron castings output. Considerable tonnage of turnings is moving into this district via lake vessel, and these shipments are expected to be increased over the remainder of the navigation season.

**Pittsburgh**—Further tightening turnings supply is indicated over the next few weeks, resulting from additional war contract cutbacks, particularly in the ammunition program. Reflecting this situation machine shop turnings are up another 50 cents and are currently moving within the range of $16 to $ 16.50. There is active demand for all scrap grades, a reversal of the former intermittent buying policy for stock replenishing. Dealers are trying to move material through yards as quickly as possible, but manpower shortage continues the major limiting factor. Steel foundries have unusually low scrap inventories. This factor, combined with the indicated continuation of current high blast furnace and steel operations are the motivating forces behind present active demand for all scrap grades.

**New York**—While there are few new orders, heavy melting steel and borings and turnings are moving in substantial volume to Bethlehem, Pa., and Sparrows Point, Md. Heavy melting still also is being shipped into the Pittsburgh area. Except for borings and turnings all major grades are at ceilings and undertone in the latter is strong. Brokers are quoting $8, New York, and $8.75, Northern New Jersey, on machine turnings and mixed borings and turningss. Curtailment in foundry operations the first week in July for vacations and inventory temporarily eased pressure on cast grades, but cast supply still is far short of demand.

**Cincinnati**— Dullness such as has not been experienced during the wartime years is current in the iron and steel scrap market. The condition is undoubtedly due in part to the holiday and vacations by many melters the week beginning July 1.

Recent purchases by mills have been small, in an apparent effort to reduce inventories. Nevertheless, this lack of interest in buying has not been accompanied by pressure on prices, which are firm at ceiling on heavy grades.

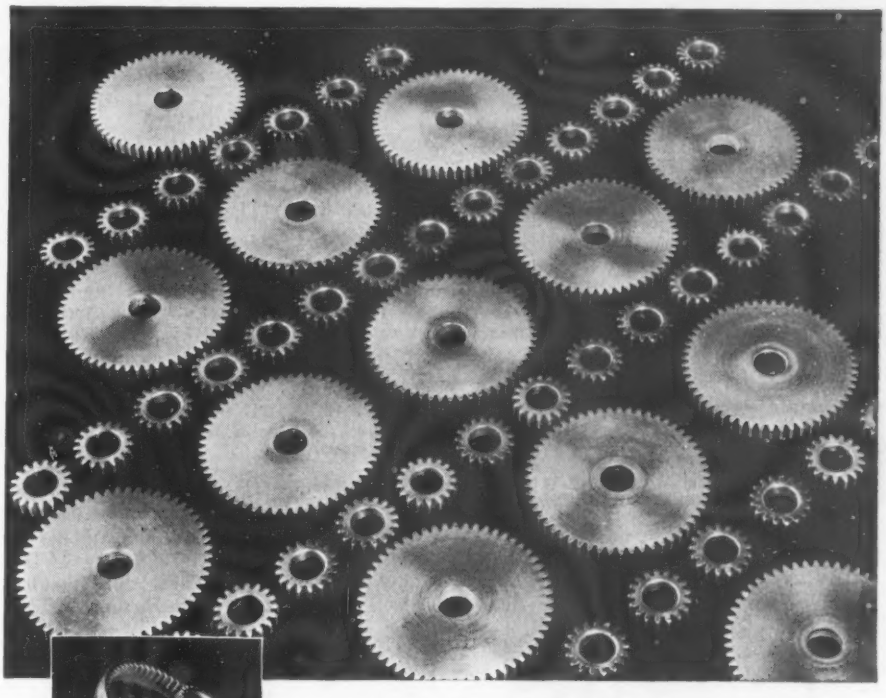
**St. Louis**—Scrap shipments continue low and demand is brisk, mainly from Chicago melters. St. Louis consumers are placing a few orders for local material but none for scrap from remote areas. Reserves are about five weeks. Heavy melting steel is most sought grade.

**Seattle**—Scrap market conditions are satisfactory to steel mills. Good material is plentiful from local sources. Inventories are being held steady. Scrap yards have less difficulty preparing material.

**Los Angeles**—Some No. 1 heavy melting steel is moving east again on priority allocations, indicating no shortage on the Coast. Mill reserves are reported ample and prices have made no advance in the last two weeks. Negligible quantities of war-front scrap are reported arriving as ballast in ships from the Orient. More non-reusable salvage material is entering the market from local sources, partially compensating for smaller tonnages of shipyard scrap. No. 1 heavy melting steel is selling at about $2 under ceiling. Receipts of turnings and borings show little change.

**Buffalo**—Stronger tendencies dominate the scrap trade following the recent buying flurry, but no appreciable new business was placed this week. While serious manpower problems still exist, dealers report no difficulty covering previous substantial sales. Dealers find workers released from war plants affected by order cutbacks are not willing to accept scrap yard jobs. Favorable weather, however, has augmented the flow of material. Signs of price hardening are noted among dealers who are discussing the possibility of higher prices on turnings, which advanced $1 a ton on latest business, but are still below ceiling. No further lake scrap has arrived since the recent re-allocation of upper lakes material originally scheduled for local consumers. The heavy flow of scrap from the eastern seaboard, however, continues, via the barge canal.

**Chicago**—Scrap prices are unchanged. The market continues active, with prime grades at ceiling and turnings and borings holding their recent advances firmly. It is reported but not confirmed the latter have taken full ceiling but these transactions appear to represent broker rather than consumer buying. Deteriorating blast furnace situation is playing a part in demand for turnings and borings. Heavy melting steel not too plentiful and with mills holding operations steady at near

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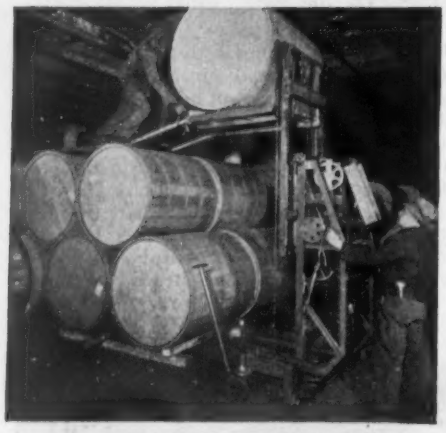

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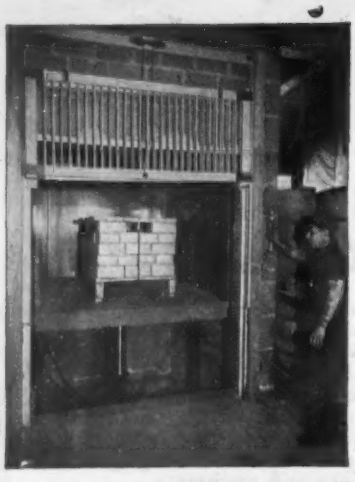

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maximum capacity good material moves readily. Inventory of some mills is not good and allocations are more numerous than recently.

## Iron Ore . . .

Iron Ore Prices, Page 182

Shipments of Lake Superior iron ore in June totaled 10,621,309 gross tons, compared with 11,910,685 tons in June, 1944, according to the Lake Superior Iron Ore Association, Cleveland. Details of shipments from various ports are as follows:

| | June, 1945 | June, 1944 |
|---|---|---|
| Escanaba | 625,753 | 755,445 |
| Marquette | 556,905 | 626,186 |
| Ashland | 565,037 | 820,791 |
| Superior | 3,446,821 | 3,944,200 |
| Duluth | 2,838,259 | 3,076,904 |
| Two Harbors | 2,521,135 | 2,687,159 |
| Total U. S. Ports | 10,553,910 | 11,910,685 |
| Michipicoten | 67,399 | 63,955 |
| Grand Total | 10,621,309 | 11,974,640 |

To July 1 total season shipments totaled 29,024,586 tons, compared with 29,376,930 tons to the corresponding date last year. Details of shipments are as follows:

| | 1945 To July 1, | 1944 To July 1, |
|---|---|---|
| Escanaba | 1,883,154 | 2,152,141 |
| Marquette | 1,446,606 | 1,298,412 |
| Ashland | 1,757,234 | 2,095,328 |
| Superior | 9,177,971 | 9,422,480 |
| Duluth | 7,576,176 | 7,315,776 |
| Two Harbors | 7,010,491 | 6,917,562 |
| Total U. S. Ports | 28,851,632 | 29,201,699 |
| Michipicoten | 172,954 | 175,231 |
| Grand Total | 29,024,586 | 29,376,930 |

A new record for ore cargoes was set July 1 by the BENJAMIN F. FAIRLESS of the Pittsburgh Steamship Co., one of the new 640-footers. This ship loaded 18,593 gross tons at Two Harbors, Minn. The prior record was 18,479 tons, loaded June 23 by a sister ship, ENDERS M. VOORHEES.

## Warehouse . . .

Warehouse Prices, Page 182

**Cincinnati**—The early-July ordering of steel from jobbers' stocks holds to recent high levels, unaffected by any cutbacks, holidays or vacation shutdowns. Rated demand is such that sales volume is keyed to supplies of active items, and ability, under handicaps, to complete preparation and make deliveries. Jobbers are moving cautiously in respect to the unrated orders.

**Los Angeles**—Deliveries of plates, except galvanized are expected to ease soon. Aside from this there is little hope of better supply. Mill shipments continue low while requests for shipment are pressing. Pipe and wire products lead in delayed delivery, with alloys slightly less pressing.

**Philadelphia** — While July got off to a slow start because of the holiday in the first week, warehouse demand in June was active, showing little change from May. Orders were a little lighter but were fully as numerous and one leading distributor reported June business on a dollar basis was equal to that of May.

**St. Louis**—Warehouse steel stocks show no improvement as a result of war cutbacks. Particular difficulty is met in sheets, cold-finished bars and tubular goods. Small diameter bars are especially scarce. Demand is slightly less but warehouses still have all the business they can handle. Some gain is expected soon as a result of WPB permitting entry of Z-3 orders, such orders coming in considerable volume.

**Cleveland**—While buying has slackened somewhat demand is still strong. In some products mill deliveries are better than recently but cancellations to mills have not eased the general situation.

**Chicago** — Warehouses continue to experience strong demand for steel, but are handicapped in accommodating it by short and unbalanced inventories. Of all products, sheets are needed most urgently, and outlook for obtaining anything near adequate tonnages from mills is discouraging. Demand for structurals also in considerable volume for manufacturing operations rather than building construction. Interest in excess prime plates is running light, despite the fact that plate mill schedules are declining.

## Canada . . .

**Toronto, Ont.** — There has been comparatively little change in demand in Canadian steel market in the past two or three weeks. While there have been some order cancellations as a result of curtailment in war production there has been no easing in steel supply and with few exceptions delivery is being extended continually. While there is still some buying on war account it is stated that a much larger portion of new business now is associated with civilian manufactures, although no large volume of consumer goods has yet started to flow off assembly lines. Permission has been granted for manufacture of a wide range of civilian goods, including washing machines, vacuum cleaners, electric stoves and numerous other types of household equipment, as well as automobiles and agricultural implements, etc., but most companies still have considerable retooling to do and there is a shortage of steel and other raw materials.

Canadian mills as a whole are heavily loaded with orders and in some special lines one or two producers have withdrawn from the market. Backlogs now extend well into 1946 and on only a few items is surplus capacity available before December. While there has been no change in steel or iron prices in Canada in the past two or three years, some producers are hopeful that government ceiling prices soon may be abandoned and in order to take full advantage of any advance in prices are adhering strictly to their policy of making price as at time of shipment, thus forward delivery contracts do not protect consumers. On many materials mills are not promising delivery for any set period, but most bookings are accepted on an if and when basis.

Sheet supply is specially tight and with continued inpouring of new orders there are no indications of early easing. While producers continue to accept business in sheets, deliveries are being more extended and now run almost to the end of first quarter. However, there is a possibility that war cancellations may make additional supplies available to

civilian users within the next three or four months, but this is problematical at the moment.

There has been little change in bars, both carbon and alloy. While there have been some war contract cancellations, these have been far overshadowed by buying from non-war consumers. Carbon bar demand has been gaining in volume in the past week or ten days and delivery extends well into December with some booking into January.

The plate situation appears easiest of all materials and Ontario mills are quoting delivery within four months. Fresh buying is developing on a broader scale for non-war use and it is not expected there will be much improvement in the present delivery situation this year. Heavy orders have been closed recently from railroad car and locomotive builders and buying on a large scale is reported from agricultural implement makers. Building trades and mining interests also have been more prominent in the market for plates in the past two or three weeks.

Mills are said to be filled with orders for wire and nails and some producers have withdrawn from the market on certain lines of nails. The shortage of nails is said to be due to the fact that skilled labor is not available.

While there was some slowing down in merchant pig iron sales late last week as a result of the Dominion holiday, there are indications of more normal action.

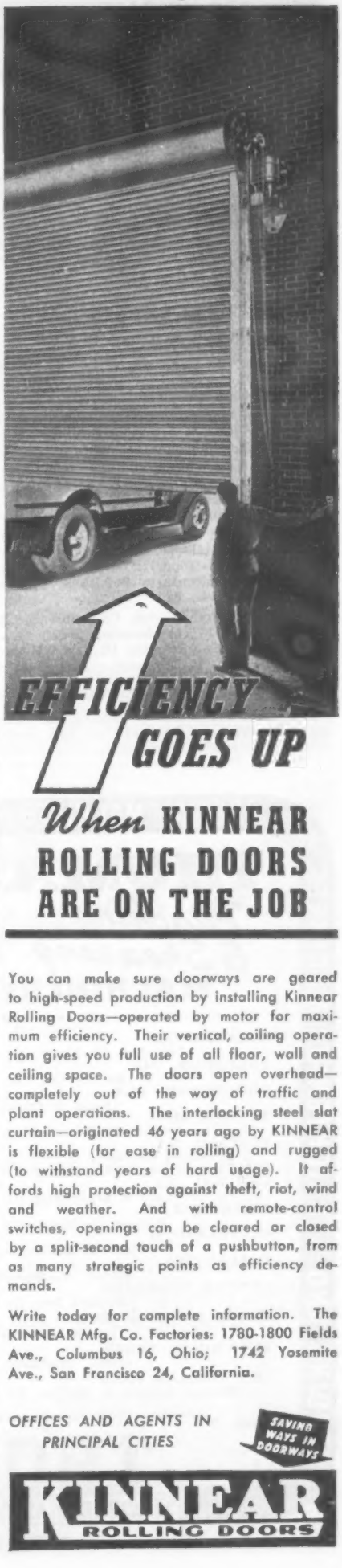
Scrap iron and steel receipts continue in good volume and many dealers now are accumulating supplies for future sorting. However, there has been further slowing in offerings from war plants due to curtailment in war production by a number of plants in this area.

Iron and steel production in Canada showed a minor decline in May from April, according to the Dominion Bureau of Statistics. In May pig iron production amounted to 155,574 net tons which indicates a daily average of 5018 tons compared with 5202 tons per day for April. Output in May also fell below the corresponding month of last year. Production of steel ingots and castings in May totaled 267,643 net tons for a daily average of 8633 tons, compared with 9140 tons per day in April. Production of ferroalloys made a new record for the year at 19,883 net tons. There was no change in the number of blast furnaces blowing in May from the preceding month. At the end of May 9 stacks were in blast and 5 were blown out. Comparative production figures, in net tons, are as follows:

| | Steel ingots, castings | Pig iron | Ferro-alloys |
|---|---|---|---|
| May 1945 .... | 267,643 | 155,574 | 19,883 |
| April 1945 .... | 274,213 | 156,070 | 18,350 |
| May 1944 .... | 263,431 | 175,207 | 17,906 |
| 5 Mos. 1945 .. | 1,338,503 | 782,917 | 80,199 |
| 5 Mos. 1944 .. | 1,271,833 | 627,343 | 60,316 |
| 5 Mos. 1943 .. | 1,259,652 | 719,900 | 93,642 |

## Steel in Europe . . .

**London** — (*By Radio*) — Third quarter demand for steel in Great Britain points to increasing confidence in early expansion of the industry. Sheet mills are heavily booked and delivery dates have been further extended. Semifinished steel is needed in larger supply for rerollers.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## REINFORCING BARS . . .

### REINFORCING BARS PLACED

190 tons, wire mesh, SBI route 18, Secs. 13-R and 14-R, Kendall county, Ill., for state highway commission, to American Steel & Wire Co., Chicago; R. R. Anderson Co., Chicago, contractor; bids June 15.

### REINFORCING BARS PENDING

500 tons, veterans hospital, Sioux Falls, S. D., for U. S. Veterans Administration, bids taken May 22 rejected; McGough Bros., St. Paul, was low bidder on general contract.

153 tons, power plant addition, Indianapolis, for Indianapolis Power & Light Co.; bids June 5.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

3900 tons, Ternstedt Mfg. Division, General Motors Corp., Columbus, O., to R. C. Mahon Co., Detroit; bids June 4.

2080 tons, storage warehouse, East Chicago, Ind., for RFC, to Bethlehem Steel Co., Bethlehem, Pa.; bids June 18.

960 tons, power plant addition, Indianapolis, for Indianapolis Power & Light Co., to Central States Bridge & Structural Co., Indianapolis; bids June 5.

335 tons, plant addition, New Departure Division, General Motors Corp., Hartford, Conn., through Topper & Griggs, New Haven, general contractors, to Bethlehem Fabricators, Bethlehem, Pa.

220 tons, factory addition, Caterpillar Tractor Co., Peoria, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Fred Harbers Sons, Peoria, Ill., contractor; bids June 15.

### STRUCTURAL STEEL PENDING

1000 tons, store, factory building and boiler house, Nineteen Hundred Corp., St. Joseph, Mich.; general contract to Pierson Construction Co., Benton Harbor, Mich.; bids June 14.

955 tons, bridge requirements, various locations, for Atchison, Topeka & Santa Fe railroad; bids July 10.

350 tons, factory building, Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.

100 tons, plant addition for Electric Hose & Rubber Co., Wilmington, Del.; general contract to John E. Haley, Wilmington, Del.

Unstated, open grill decking, 8320 square feet, for Montlake bridge improvement, Seattle; plans approved, bids soon.

## PLATES . . .

### PLATES PENDING

Unstated, two 80,000-barrel or storage tanks at Manchester, Wash.; bids in to Navy July 3.

## PIPE . . .

### CAST IRON PIPE PLACED

275 tons, 8 and 16-inch, for local extensions, Seattle, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

200 tons, 12,500 feet, for Vancouver, Wash., to Pacific States Cast Iron Pipe Co., Portland, Oreg.

### CAST IRON PIPE PENDING

Unstated, 14,500 feet, 4, 6 and 10-inch for Carlton, Oreg.; bids July 9.

Unstated, Fourth Avenue N. E. project, Seattle; bids soon.

Unstated, 6, 8 and 10-inch, for army center Opportunity, Wash.; general contract to Rushlight Auto Sprinkler Co., ortland, 74,-164.

Unstated, 8-inch for system improvement, Grandview, Wash.; $20,000 available.

## RAILS, CARS . . .

### RAILROAD CARS PLACED

Erie, 700 fifty-ton box cars, to American Car & Foundry Co., New York; bids on 600 gondolas and 100 covered hoppers will be opened July 9.

### LOCOMOTIVES PLACED

Delaware & Hudson, five freight locomotives, 4-6-6-4 type, to American Locomotive Co., New York.

Northern Pacific, nine diesel-electric switchers, eight of 1000 horsepower, to Baldwin Locomotive Works, Philadelphia, and one 660-horsepower to American Locomotive Co., New York.

### LOCOMOTIVES PENDING

Minneapolis & St. Louis, four 1000-horsepower diesel-electric switchers and one 1350-horsepower diesel unit; purchase authorized.

## Biddle Urges Independent Operation of Geneva Plant

(*Concluded from Page 77*)

11. Control of western operation by eastern steel interests does not promise independent and competitive pricing.

12. Basic facts such as western operating costs, future transportation rates, market possibilities and disposal terms should be immediately made widely available to insure the widest possible independent interest.

13. Even on the basis of 1937 demand for steel, continuous production in the West is justified if independent operators are not saddled with excessive investment costs.

14. Competition can be expected from eastern producers with all water access to Pacific ports. Continuous production at Geneva would be complementary to the producing facilities in the West.

15. Successful continuous steel making operations in the West afford the soundest basis for future industrial expansion in that area. Western fabricating industries can be expected to develop only when cost of steel is competitive with similar costs in other sections of the country.

## Renegotiation Hits Labor As Well as Management

(*Concluded from Page 79*)

production and efficiency in lowering costs; increased labor and material costs; complexity of manufacturing techniques; the financial record of the company, what the earnings were over the period 1936-1939, which is the so-called base period; the extent of conversion to the war effort and the percentage of profits to net worth.

The 1942 allocation of a company to a Price Adjustment Board was determined first by its major production item. If it were for Army Ordnance, the District Ordnance board in the nearest proximity to the company handled the renegotiation. If the Engineer Corps used the greatest part of the company's output, that board determined the allowable profit. Each board was a law unto itself. In 1943 and continued in 1944 allocation


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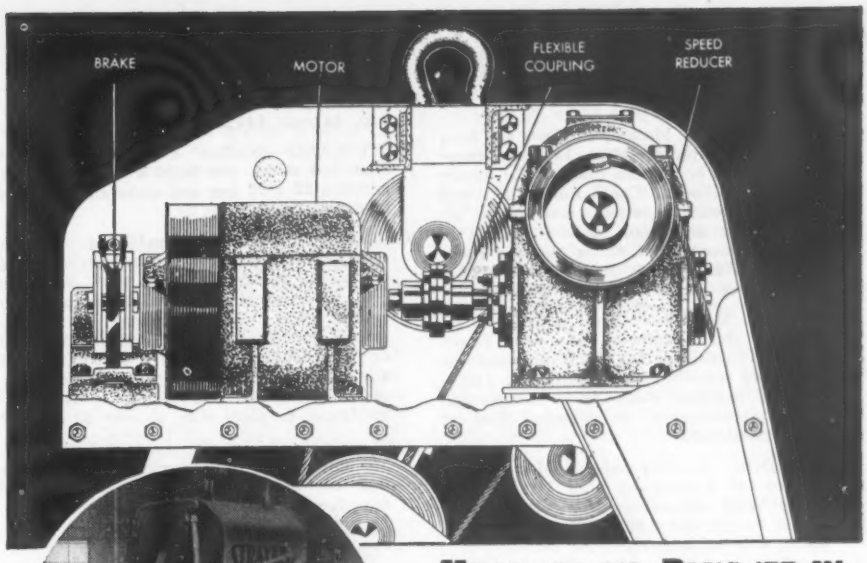
to the services was made by industries thereby achieving somewhat more uniformity of standards in judging as to the existence or non-existence of excessive profits. The War Department now conducts all aircraft, textile and rubber renegotiations; the Navy Department has steel and electrical manufacturers, and the RFC has the machine tool industry.

It is indeed a tremendous undertaking for these Price Adjustment Boards. In the early days they started off each day with some manufacturers' challenge: Why do we have renegotiation? The internal revenue law is all that is needed to tax our so-called excess profits. They are likewise confronted by the unspoken basic objection to compulsory repricing and renegotiation by individuals who determine what constitutes "a reasonable profit" without the establishment of rules or standards for making such determinations. They cannot refute the premise that renegotiation deals with current annual profits and not with possible subsequent years' losses. But quite unperturbed, they peg away with their difficult and thankless job of administering this unprecedented law as they see it.

It's a pity that these staffs could not have been recruited from industry, particularly by those who at one time scraped the bottom of the barrel to meet a shop payroll. But most of our seasoned manufacturers are "in there pitching" adding their own products to our armament stockpiles. Therefore the job inevitably fell to accountants who know figures and to the lawyers who know how to interpret laws and directives.

Scraping the bottom of the barrel to meet a shop payroll is a tough experience. Having successfully sweated it through, an employer emerges a different man, schooled in the "facts of life" as they relate to operating a plant. Profits from the "fat" war years have to be intangible cash if they are to be used to meet payrolls in the "lean" years ahead.

In the case cited, the bulk of the profits are in the assets as additional plant and equipment. The management needed this extra capacity to meet his delivery schedules and to increase plant efficiency through building machines in larger lots. In 1942 when he expanded his facilities he never dreamed that over and above his hefty taxes he would be obliged to refund annually an additional sum thru renegotiation, and that in three years it would cost him $119,000. With this nest egg snugly tucked in the bank in war bonds it would have meant facing the postwar period with immeasurably more confidence and aggressiveness. As it now appears, his cushioin of cash reserves will not carry through the second postwar year. That will mean he will have to borrow. He will not mind too much, but then should stiff competition, and oversold markets and deflation hit him hard, it will mean hanging the "no help wanted" sign on the gate, and perhaps soon thereafter telling the returned veteran and his older loyal men that it's hopeless to carry on. He will not blame it on anything or anyone, but in his case renegotiation will have proved profoundly wrong.

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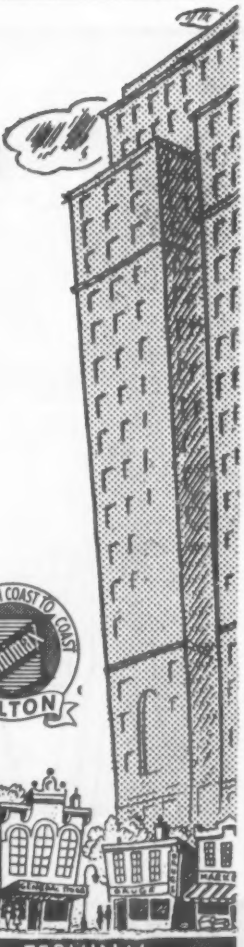

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# CONSTRUCTION AND ENTERPRISE

## OHIO

AKRON, O.—Dover Machine Products Co. Inc., Edward J. Harris, president, has been organized and has bought the plant of the former E. J. James Co. at Canal Fulton, O., and plans to expand operations, erecting an office building and plant adition. Stock is owned by members of Akron Machine Products Co., 572 South High street, Akron, O., manufacturer of tire-building machinery.

BELLEVUE, O.—Nickel Plate railroad, J. C. Wallace, chief engineer, Terminal Tower building, Cleveland, has WPB approval for an 18-stall roundhouse and turntable, 120 x 140-foot machine shop, boiler house and other improvements, at estimated cost of about $1,500,000.

CAMBRIDGE, O.—Reynolds Molded Plastics Division of Continental Can Co. has received WPB authorization for plant expansion at cost of about $500,000 for buildings, which will be one story.

CLEVELAND—Cleveland Welding Co., 2115 West 117th street, has permit for a one-story 100 x 200-foot welding building, to cost about $50,000.

CLEVELAND—Modern Gas Furnace Co. has been incorporated with 250 shares no par value to manufacture heating furnaces, by Gerald A. Doyle, agent, 517 N. B. C. building, E. E. Tait and J. L. Vaughan.

CLEVELAND—Republic Steel Corp., Republic building, has received WPB authorization to install a heavy-duty vertical edging stand, bar mill, open hearth and necessary motors and controls at its Youngstown, O., plant, to cost $107,000.

CLEVELAND—Aluminum Co. of America has received WPB authorization for additions to water recirculating building No. 153 and recirculating system pumps, chlorinating system, to cost $42,250.

CLEVELAND—Mueller Electric Co., 1583 East 31st street, will build a one-story plant addition 29 x 77 feet and make alterations to other buildings.

CLEVELAND—Republic Steel Corp. has received WPB authorization for installation of equipment at Massillon, O., plant including cold-rolling, pickling, annealing, cleaning and slitting units, with construction of a substation, to cost $943,000; addition to plant at Niles, O., 108 x x 220 x 48 feet, costing $863,000; building addition at Youngstown, including stands and coiler, furnace and auxiliaries to plate mill, to cost $2,175,000

CUYAHOGA FALLS, O.—Summit Grinding & Machine Co. has been incorporated with $51,000 capital to do precision grinding and manufacture machine parts. H. W. Schwab, First Central Tower building, Akron, O., is agent.

DAYTON, O.—Chrysler Corp. has WPB authorization for construction of new boiler house and installation of boilers, stokers, water softeners, etc., to cost $339,772.

DAYTON, O.—National Cash Register Co., 1400 South Main street, has let contract to Industrial Building Co., Reibold building, for a plant addition to cost about $40,000.

DAYTON, O.—Delco Products Co., division of General Motors Corp., First street, has let contract to James I. Barnes Construction Co., Talbott Realty building, for a six-story factory building 172 x 184 feet on First street, estimated to cost $810,000. Argonaut Realty Co., General Motors Research building, Detroit, is engineer.

DEFIANCE, O.—Defiance Metal Products Co., M. Zachrich, general manager, plans a plant addition 64 x 114 feet, including inside loading dock and crane, to cost about $40,000.

NAPOLEON, O.—Board of public affairs plans postwar water softening plant, and additions to equipment in waterworks plant, to cost about $200,000.

SANDUSKY, O.—Apex Electric Mfg. Co., C. G. Frantz, president, is preparing to reconvert and enlarge plant at cost of about $750,000.

ST. MARYS, O.—City, City Hall, will take bids soon for a water softening plant to cost about $120,000. F. G. Browne, Marion, O., is engineer.

TIFFIN, O.—General Electric Co., 1635 Broadway, Fort Wayne, Ind., has let contract to the Austin Co., 11612 Euclid avenue Cleveland, for design and construction of a fractional horsepower motor plant, estimated to cost $5 million.

TOLEDO, O.—Schill Pattern Co., 2100 Hendon street, has let contract to John Pioch Co., 1130 Prospect street, for a one-story pattern shop, estimated to cost about $40,000.

TOLEDO, O.—Toledo Smelting & Refining Co., A. F. Sutts, general manager, 1011 Avondale street, plans construction of smelter and refinery for nonferrous metals on a site on Maumee river, to cost about $75,000.

TOLEDO, O.—Airite Mfg. Co., 730 Phillips avenue, has let contract to A. Bentley & Sons Co., 201 Belmont street, for a dairy equipment manufacturing plant at 5500 Telegraph road, to cost about $40,000, with equipment. Hahn & Hayes, 723 Adams street, are architects.

WELLINGTON, O.—Lorington Co., Clifford W. Unser, owner, will build a 40 x 100-foot sheet metal fabricatitng plant on a 3-acre site between Westlake Park and Gas avenue.

## MASSACHUSETTS

SEEKONK, MASS.—Water department, Town Hall, has preliminary plans for a complete water supply system, to cost over $300,000. Whitman & Howard, 89 Broad street, Boston, are engineers.

SPRINGFIELD, MASS.—Westinghouse Electric Corp., 653 Page boulevard, East Springfield, has let contract to Ley Construction Corp., 1215 Main street, at $76,500 for two 29 x 100 foot and two 20 x 128-foot additions.

## CONNECTICUT

HARTFORD, CONN.—Aetna Oil Burner Co. Inc., 2074 Park street, has plans for a 100 x 130-foot enameling unit plant addition on Rowe avenue.

MIDDLETOWN, CONN.—Russell Mfg. Co., East Main street, has let contract to Dennis O'Brien & Sons Inc., 190 Trumbull street, Hartford, Conn., for a one-story 65 x 125-foot laboratory on East Main street, estimated to cost $42,000.

MILFORD, CONN. — American Windshield Specialty Co., 442 Boston Post road, has let contract to DeFonce Construction Co., 110 Colonial avenue, for a 45 x 180-foot plant on Milford turnpike, estimated to cost $40,000.

PORTLAND, CONN.—Claire Glow Mfg. Co., I. M. Wolfson, 62 Maplewood avenue, West Hartford, manager, has plans by C. M. Gifford, 16 Elm street, East Hartford for postwar construction of one-story 80 x 140-foot plant on Indian Hill avenue, estimated to cost about $43,000.

## NEW YORK

BUFFALO—Testing cells at the Chevrolet aviation engine plant will be changed over for testing of a new type of jet-propulsion aircraft engines, a contract at not more than $500,000 has been let to John W. Cowper Co. Inc., 2625 Delaware avenue.

## PENNSYLVANIA

PITTSBURGH—Pittsburgh Equitable Meter Co.,

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ROLL FEEDS

*At left*—Standard Style "M" Littell Roll Feed, equipped with a 3-roll Straightener, mounted on left-hand side of an O.B.I. press, feeding left to right. *Below*—same unit, including Littell Automatic Centering Reel.

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REQUEST BULLETINS



F. J. LITTELL MACHINE CO.
4165 RAVENSWOOD AVE. CHICAGO 13, ILL.

400 Lexington avenue, has let contract to O. H. Martin, 513 North Homewood avenue, for a one-story 114 x 208-foot third story top addition. Franklin & Brown, H. C. Douden Associates, 729 Maryland avenue, architects.

WEST PITTSBURGH, PA. — Pennsylvania Power Co., Louis B. Round, New Castle, Pa., vice president and general manager, will double capacity of its power plant at cost of about $3,200,000. Plans include turbo-generator, boilers, transmission facilities and other equipment. Present capacity is 35,000 kw.

## MICHIGAN

KALAMAZOO, MICH.—E. & K. Brass, Bronze & Aluminum Foundry Inc., 1334 Ravine road, has been incorporated with $25,000 capital to operate a foundry, by William H. Exel, 1803 Shaffer street, Kalamazoo.

## ILLINOIS

PEORIA, ILL.—Johnson Instrument Co. has been formed as a branch of Sommer Products Co., manufacturer of electric welding machines, by William A. Johnson and Samuel G. Sommer, to manufacture hay balers and farm tools.

ROCKFORD, ILL.—Rockford Screw Products Co. is having plans made for a new plant on a nine-acre site on Harrison avenue.

WOODSTOCK, ILL.—Alemite Die Cast & Mfg. Co., 538 Erie street, Toledo, O., has let contract to O. E. Strom, 102 Main street, Crystal Lake, Ill., for a two-story plant addition costing about $100,000.

## INDIANA

AUBURN, IND.—Board of public works, F. A. Potter, secretary, has plans completed for a 500,000-gallon elevated steel water storage tank, to cost about $100,000. Boyd E. Phelps Inc., 622½ Franklin street, Michigan City, Ind., is consulting engineer.

EVANSVILLE, IND.—Servel Inc., L. Ruthenberg, president, Franklin street and Kentucky avenue, plans two one-story plant buildings, 94 x 270 feet and 100 x 100 feet, to cost about $100,000. E. C. Berendes, 121 NW Fourth street, is architect.

## MISSOURI

ST. LOUIS—Southern Equipment Co., 5017 South 38th street, has let contract to L. O. Stoocker Co., 806 Olive street, for a one-story 120 x 150-foot factory at 5201 South 38th street, to cost about $40,000. E. J. Lawler, 806 Olive street, is architect.

ST. LOUIS—Hussmann-Ligonier Co., W. B. McMillan, president, 2401 North Leffingwell avenue, has let contract to Fruin-Colnon Construction Co., 502 Merchants Laclede building, for two one-story plant buildings, to cost about $500,000.

ST. LOUIS—Marlo Coil Co., 6135 Manchester avenue, has let contract to H. LaBoube, 7404 Devonshire avenue, Shrewsbury, St. Louis, for a one-story 60 x 240-foot addition to cost about $40,000. Brussell & Viterbo, 806 Olive street, are engineers.

## WISCONSIN

GREEN BAY, WIS.—Wisconsin Public Service Corp. has let contract to C. R. Meyer & Sons Co., Oshkosh, Wis., for substructure of power plant to cost about $3 million for building and equipment. Public Utility Engineering & Service Corp., 231 South LaSalle street, Chicago, are engineers.

LUXEMBURG, WIS.—Village, C. Ross, clerk, plans a water and sewage system to cost about $125,000. McMahon Engineering Co., Menasha, Wis, is engineer.

PORT WASHINGTON, WIS.—Wisconsin Electric Power Co., 231 West Michigan street, Milwaukee, plans electric power plant addition costing $7,119,500. Structural steel to Milwaukee Bridge Co.

## TEXAS

EL PASO, TEX.—Texas Aluminum Casting Co. has plans under way for postwar construction of a foundry to cost about $100,000.

HOUSTON, TEX.—A. I. Martin Welding Co., 1107 Austin street, has plans under way for a plant building estimated to cost $40,000.

## IOWA

GLENWOOD, IOWA—City holds special election July 9 on $249,000 bond issue for a municipal electric light and power plant and equipment.

NEW HAMPTON, IOWA—City has plans by J. B. Harris Co., 702 Wesley Temple building, Minneapolis, for improvements to municipal electric light and power plant, including steam generating unit, boiler room addition with coal-handling equipment, etc., at estimated cost of $125,000.

## CALIFORNIA

LOS ANGELES—Western Arc Welding Inc. has building permit for a factory building at 755 Kohler street, 100 x 100 feet, to cost about $50,000.

LOS ANGELES—E. L. Christman has permit for construction of a machine shop at 8259 South Compton avenue, 40 x 50 feet, to cost about $4500.

LOS ANGELES—Coast Coil Spring Co. has let contract to Buttress & McClellan, 1013 East Eighth street, Los Angeles, for a factory and office building at 128 East 58th street, to cost about $40,000.

SAN CARLOS, CALIF.—Welding Services Sales, 605 Old County road, plans rebuilding of its war production plant at cost of about $75,000.

SAN FRANCISCO—Golden West Plating Works, A. D. LaMar, manager, 60 Juniper street, plans rebuilding its three-story plant, at cost over $50,000.

VERNON, CALIF.—Modern Metal Fabricators have let contract to Buttress & McClellan, 1013 East Eighth street, Los Angeles, for a plant 75 x 125 feet.

## OREGON

ROSEBURG, OREG. — Pacific Co-operative Poultry Producers, G. C. Keebey, manager, plans a $500,000 construction for four Oregon cities, Roseburg, Salem, Newberg and Medford. Plans also are being prepared for a $300,000 feed mill and additional warehouse facilities at Eugene, Oreg.

## WASHINGTON

ELLENSBURG, WASH.—Northwest Chemurgy Co-operative has obtained priorities for machinery for a proposed starch plant here, an existing building to be remodeled for its plant.

SEATTLE—Reichold Chemical Inc. is considering sites for construction of a synthetic resin plant in Seattle.

SEATTLE—Puget Sound Bridge & Dredging Co. has let contract to General Construction Co. for a pier 50 x 600 feet and a frame powerhouse at its shipyard plant, to cost $342,000.

SEATTLE—Seattle has approved plans and will call bids as soon as materials are available for decking Montlake bridge with open grill steel, to cost about $36,372, requiring shapes, reinforcing steel and steel decking.

SEATTLE—Pacific Car & Foundry Co., owner of a controlling interest in Kenworth Motor Truck Corp., has plans for a truck and bus fabricating plant adjacent to its car shops at Renton, Wash. WPB has approved a $250,000 project, providing 200,000 square feet of floor space. Kenworth operations will be removed from Seattle.


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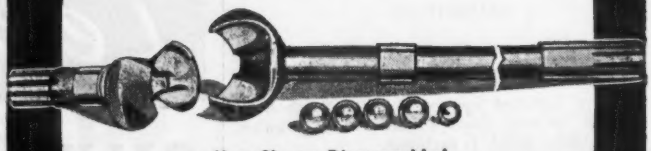

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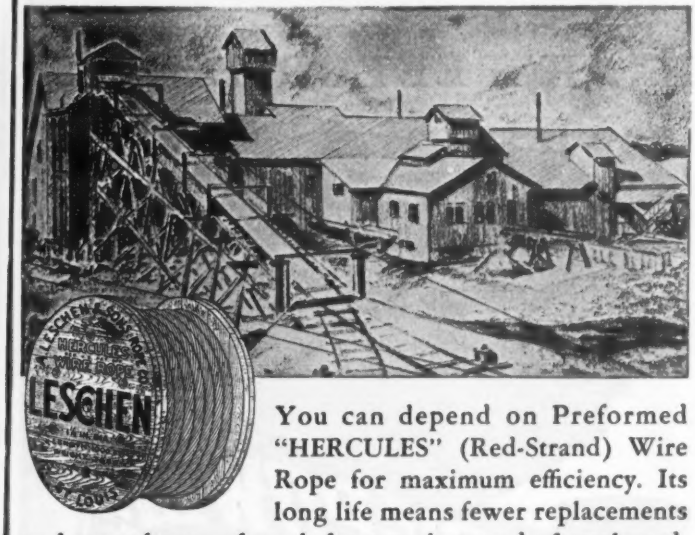


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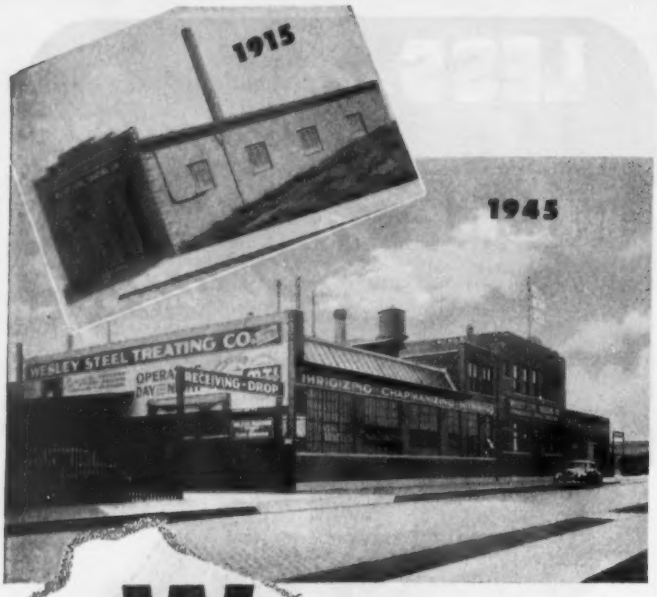


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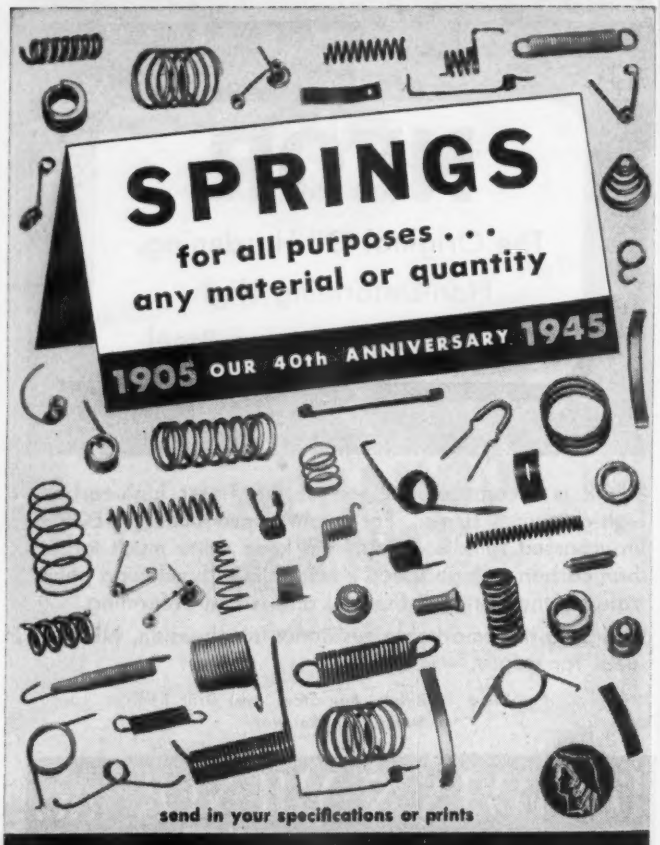
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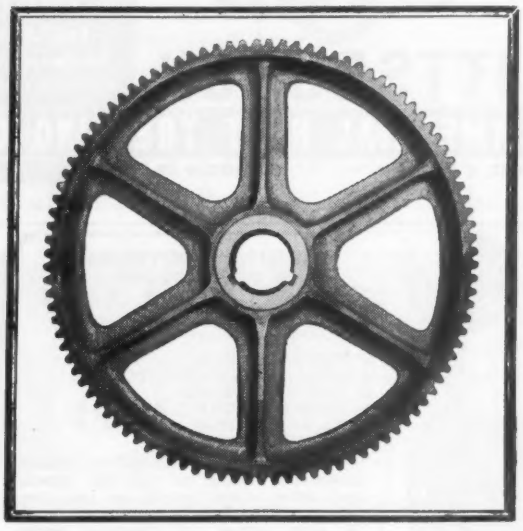

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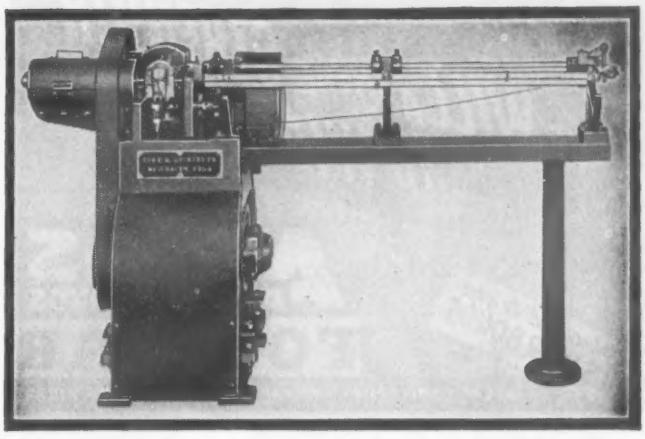

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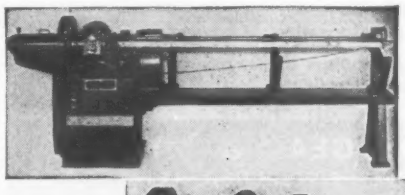

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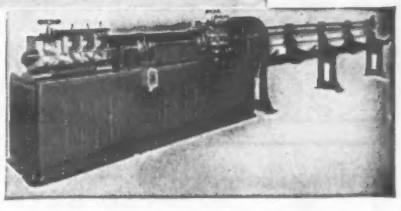

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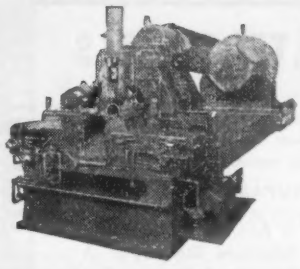

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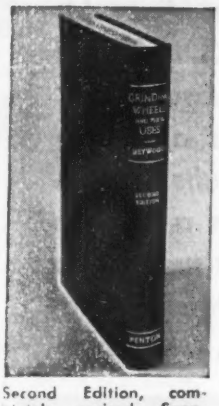

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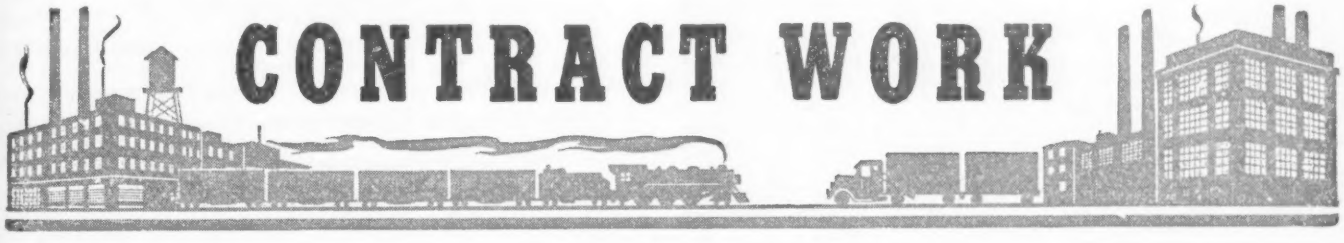


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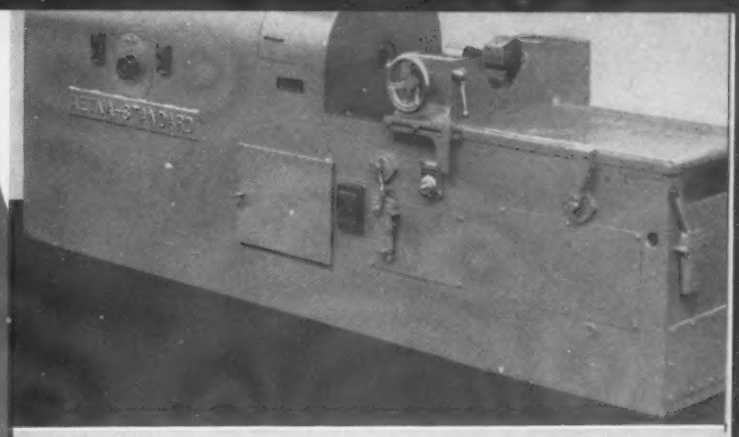
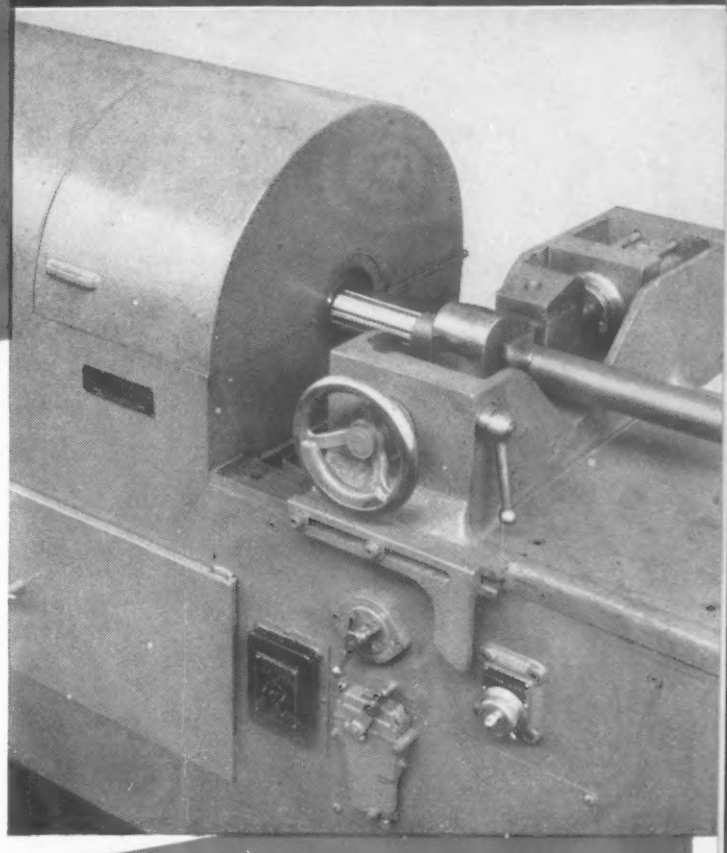
ANOTHER ADVANCED FEATURE
*by* AETNA-STANDARD

# BAR TURNING POINTER

*with Automatic Hydraulic Feed*





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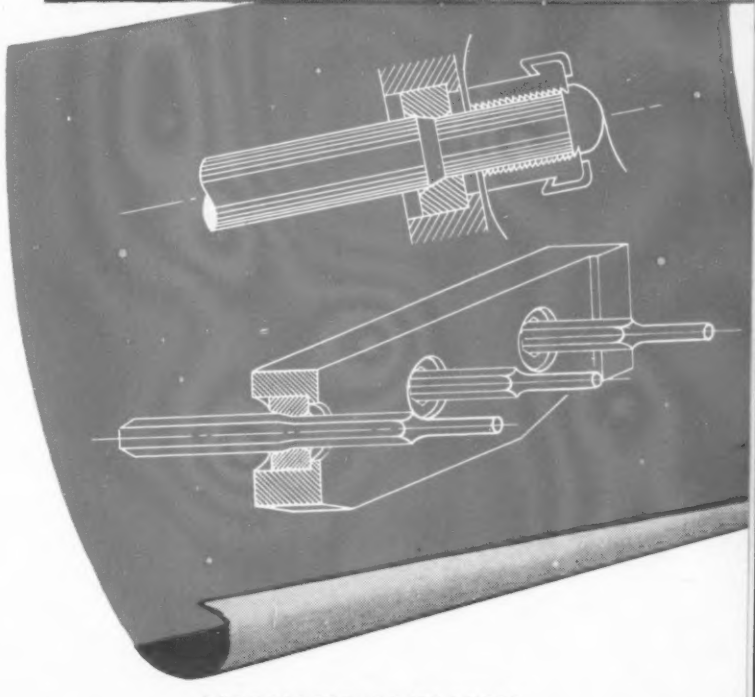

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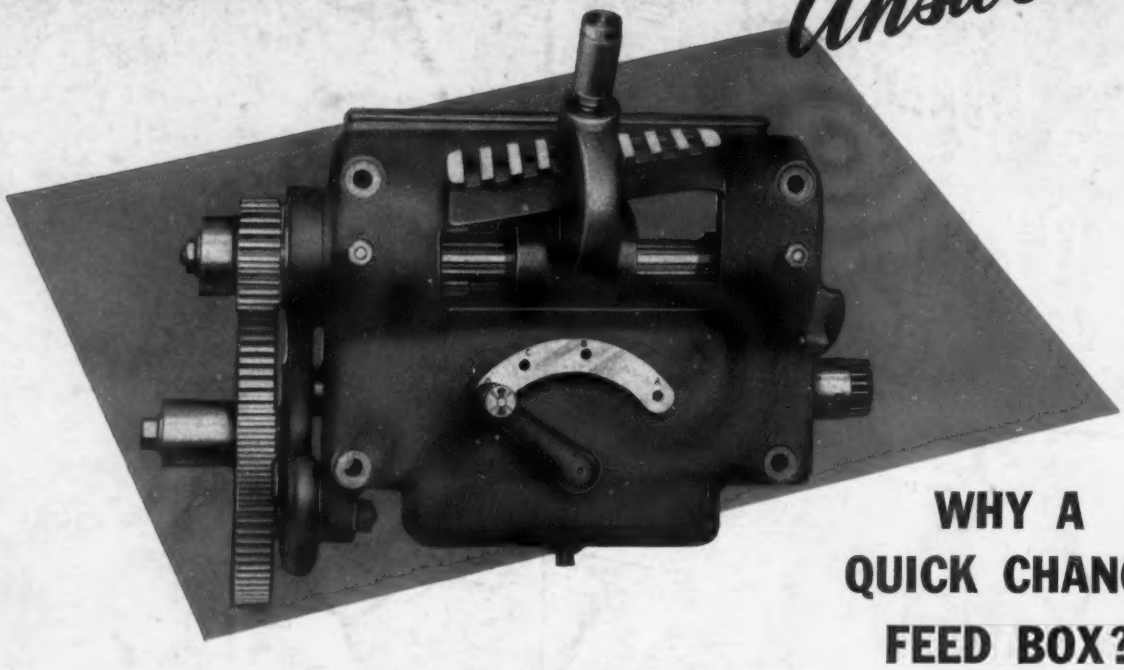

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